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CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

CURRENT PLANS TO MECHANIZE CONSTRUCTION WORK DESCRIBED

Moscow BYULLETEN' STROITEL'NOY TEKHNIKI in Russian No 2, 1979 pp 4-8

[Article by V. V. Semkovskiy, deputy chief of the Construction Mechanization Section of USSR Gosstroy: "The Plan for the Comprehensive Mechanization and Automation of Construction and Installing Work in 1979"]

[Text] The Tenth Session of the Ninth Convocation of the USSR Supreme Soviet confirmed the State Plan for the Economic and Social Development of the USSR During 1979, which the November 1978 CPSU Central Committee Plenum had approved. The CPSU Central Committee decree emphasizes that the most important task of ministries and agencies, party, soviet and social organizations, and laboring collectives is a further intensification of the drive to raise the effectiveness of social production and the quality of work. Special attention should be paid to raising labor productivity, introducing the achievements of science and of advanced experience, and new equipment and technology into production operations, bringing available reserves and opportunities for increasing output into operation, and raising the technical level of output at minimal expense.

The board [of USSR Gosstroy] has examined and USSR Gosstroy has approved the plan for comprehensive mechanization and automation of construction and installing work in 1979, which includes goals for reducing the amount of work performed manually, raising the level of mechanization and automation of construction and installing work, improving the use of construction machinery and trucks, and improving the centralized repair of construction equipment. The plan goals have been aimed at increasing labor productivity in construction, which should grow by 4 percent.

Data reported for the first half of 1978 indicates that goals for reducing the amount of manual work per estimated million rubles' worth of construction and installing work are being met as a whole for a group of selected organizations. At the same time, the amount of various types of work performed manually is increasing in the construction organizations of some ministries. Thus, manual loading and unloading of constructional structure, timber and metal increased in USSR Minugleprom [Ministry of Coal Industry] and Mintransstroy [Ministry of Transport Construction] organizations during the first half of 1978 in comparison with the corresponding period of 1977.

The amount of concrete work carried out with the use of manual labor is being reduced slowly at USSR Minsel'sstroy [Ministry of Rural Construction] organization construction projects and also within organizations subordinate to the RSFSR and Kazakh SSR councils of ministers. The amount of manual plastering per estimated million rubles' worth of work at USSR Mintyazhstroy [Ministry of Construction of Heavy Industry Enterprises], Mintransstroy, and Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises] facilities increased in the first half of 1978 over the first half of 1977.

Organizations of some construction ministries are not paying proper attention to automating processes for preparing concrete mix and mortar. The level of automation of the preparation of concrete mix and mortar by USSR Minvodkhoz [Ministry of Land Reclamation and Water Resources], Mintransstroy, Minneftegazstroy and USSR Minugleprom organizations is substantially lower than the plan goals for 1978. USSR Minenergo [Ministry of Power and Electrification], USSR Minpromstroy [Ministry of Industrial Construction] and USSR Minstroy [Ministry of Construction] organizations are not introducing automated concrete-and-mortar installations into operation on time.

Construction ministries and agencies are not using completely the reserves available for raising the operating effectiveness of construction machinery and trucks. Output per single-bucket excavator increased in the first half of 1978 by only 0.4 percent over the first half of 1977, and output per crane during installing work remained at the same level. The operating regime of machines did not change essentially for construction work as a whole over the corresponding period of 1977.

There are serious deficiencies in organizing construction-equipment repair. The repair base of most ministries has been fragmented, as a consequence of which the level of concentration of repair production work is low, and this hampers the development of specialization. Some construction ministries are not providing support for the necessary development of the capacity of the base for repair work on construction machinery. This occurs particularly in USSR Mintyazhstroy, USSR Minpromstroy and Minneftegazstroy.

Last year truck utilization worsened in USSR Minenergo, Mintransstroy, USSR Mintyazhstroy, USSR Minpromstroy and USSR Minsel'sstroy organizations. The share of haulage of freight on truck trailers was inadequate, especially in USSR Minenergo and Mintransstroy organizations.

The above-mentioned deficiencies in the work of construction organizations of the ministries and departments were noted by the USSR Gosstroy Board during a review of the draft of the plan for the comprehensive mechanization and automation of construction and installing work during 1979.

Calculations indicate that, in order to realize the capital construction program approved for 1979, large amounts of labor-intensive work are to be done at the selected group of ministries and agencies. For this purpose,

the following amounts of basic construction work must be performed in 1979: earthmoving--14,149 million cubic meters; loading and unloading of quarried materials--1,100 million tons, of constructional structure, timber and metal--766 million tons, of cement--53 million tons and of concrete--89.7 million cubic meters; plastering work--414.5 million square meters; and painting--1,052 million square meters.

The plan specifies tasks for reducing the amounts of work done manually per estimated million rubles' worth of construction and installing work in percents of the amount of work done in 1975. While the total amount of work will grow, the physical amounts of work performed manually per million rubles' worth of construction and installing work is to be reduced for the selected group of organizations by averages of: 19.8 percent for earthmoving, 22.9 percent for concreting, 24.4 percent for plastering, 20.3 percent for painting and, for loading and unloading work--26.2 percent for quarried materials, 26.5 percent for constructional structure, timber and metal, and 25.1 percent for cement.

The mechanization of construction and installing work and the reduction in manual-labor expenditure in performing all types of construction work are the main areas for fulfilling labor productivity growth goals in construction work. Analysis indicates that the chief reserves for reducing labor expenditure and, in particular, for reducing manual labor are:

Strict observance of the operating sequence in carrying out the work and various operations;

Improvement in supplying construction projects with materials and structure;

The provisioning of workers with tools and small-scale mechanized equipment; and

Increased factory preparation of articles and structures that arrive at the construction projects.

The improvement of design solutions by taking into account the use of modern methods and mechanization equipment also is of great importance.

The percent of workers who work manually is highest in plastering, painting and masonry, facing and other work. This is explained primarily by the fact that comprehensive mechanization of operations has not been achieved here. The introduction of sets of standard equipment for these operations will enable the mechanization level of labor-intensive processes in construction to be raised and output per worker to be increased in in-kind indicators. However, as checks indicate, the equipping of brigades with standard sets of equipment is being accomplished by only 25-30 percent. Only in certain organizations have 50 percent of the brigades been supplied with standard sets of equipment.

In 1978 the question of providing construction operations with mechanized tools and construction-finishing machines was examined by USSR Gosplan and USSR Gosstroy with the participation of the construction ministries and agencies. As a result, measures for increasing the output of tools and for developing the production capacity of Minstroydormash [Ministry of Construction, Road and Municipal Machine Building] plants were planned. An increase in the production of tools and of construction-finishing machines depends to a great extent upon introducing into operation the Volkovysk Roofing and Finishing-Work Machine Plant and the Stroyinstrument plant in Kostopol', as well as the finishing-machine plant in Dneprorudnoye, which is being built by USSR Minpromstroy and USSR Mintyazhstroy organizations.

A number of organizations are paying constant attention to questions of regularizing work performance, improving mechanization and reducing manual-labor expenditure. Thus, USSR Minstroy and USSR Minenergo organizations are paying proper attention to these questions. For example, USSR Minstroy is systematically following up on progress in meeting the plan goals for reducing manual-labor expenditure, and a procedure has been established under which all earthmoving should be carried out by trusts for mechanization below the designed grade level, and Orgtekhstroy trusts have been charged with paying special attention to questions of reducing manual-labor expenditure when they compile plans for organizing and performing the work. USSR Minenergo has established a list of processes and operations the execution of which by manual labor is not allowed.

A reduction in labor expenditure depends greatly upon supplying brigades with mechanized tools and small-scale mechanization equipment. The creation of specialized small-scale mechanization administrations, the equipping of worker brigades with standard sets of equipment by type of work, and improvement in the organization of work that uses small-scale mechanization equipment will provide for a considerable reduction in labor expenditure.

In accordance with the plan approved by 1979, the amount of work done by progressive mechanized methods is to increase still more. Thus, the amount of earthmoving work performed by scrapers is to be brought up to 1,470,100 cubic meters versus the 1,275,700 cubic meters done in 1977. The amount of earthmoving and quarrying work carried out by mechanized hydraulic equipment for the selected group of organizations is being increased in 1979 to 485,200,000 cubic meters versus the 471,100,000 cubic meters done in 1977.

The plan calls for a further increase by Union-republic construction ministries, agencies and construction organizations in the use of automated hydraulic dredges and trenching excavators with automatic control of the operating implement. The amount of earthmoving work carried out by automated hydraulic dredges and trenching excavators with automatic control of the operating implement is to increase by 83.1 million cubic meters over 1978.

The 1979 plan calls for a further rise in the level of automating the preparation of concrete mixes and mortars. The amount of concrete-mix preparation at automated plants and installations will increase from the 73.1 million cubic meters expected for 1978 to 86.2 million cubic meters. Mortar preparation at automated installations will be increased from the 6.3 million cubic meters expected in 1978 to 18.7 million cubic meters. This will enable the level of automation of concrete-mix preparation to be raised in 1979 to 46.7 percent versus the 42.2 percent expected in 1978; and of mortar—to 38.1 percent versus 35.4 percent, for the selected group of Union-republic construction ministries, departments and construction organizations.

The plan for 1979 calls for work to be done to check, under operating conditions, the effectiveness and quality of the first industrial series of a number of new standard-size machines: hydraulic excavator-levelers, excavators with thrust-type clamshell buckets for work carried out by the "wall-in-the-ground" method and with a double-action hydraulic hammer, hydraulic self-propelled jib cranes on special automotive-type chassis, road machinery, mechanized tools, and so on. The results of these checks will preclude the series production of new machines that have design defects.

The plan establishes tasks for ministries and agencies to further improve utilization of the machinery fleet in construction work. The average output per excavator, in a comparison with the data reported for 1977, should grow by 3.2 percent, per scraper by 5.6 percent, per bulldozer by 4.7 percent, per tracked or pneumatic-tired crane with load-lifting capacity of less than 25 tons by 11.4 percent, and per tower crane by 15.1 percent.

Output capabilities per earthmoving machine for the main ministries that were established for 1979 are shown in table 1.

Table 1

Output Capabilities of Earthmoving Machinery

Ministry	Single-bucket excavators, thousands of m ³ per m ³ of bucket capacity	Scrapers, thousands of m ³ per m ³ of bowl capacity	Bulldozers, thousands of m ³ of earthmoving work per bulldozer of 100-hp standard equivalent power
USSR Minenergo	105	6.5	42
Minneftegazstroy	115	4	40
USSR Minvudkhov	155	8.6	93
USSR Mintyazhstroy	111	5.7	36
USSR Minpromstroy	111	4.6	38
USSR Minstroy	128	4.9	42
USSR Minsel'stroy	71	4	22
Mintransstroy	106	5.5	15
USSR Minmontazh-spetsstroy	126	6.5	31

The construction organizations of the ministries and agencies have substantial reserves for improving the utilization of machinery by increasing its use on shiftwork, reducing idle time within shifts, and improving the technical servicing and repair of machines. The brigade contract and advanced methods for organizing production operations must be disseminated more widely for equipment operators.

Because of growth of the machinery fleet, questions of raising the technical level of the operation and repair of machines are acquiring special importance. One of the most important measures is introduction of the new standards-setting document, "Recommendations on Organizing the Technical Servicing and Repair of Construction Machinery," which calls for the implementation of a PPR [planned preventive maintenance] system based upon new principles for reporting the machinery's operation—on the basis of accrued running time. This will enable technical servicing and repair of the machines to be performed on the technically substantiated dates.

With a view to raising the technical level of repair of construction machinery and improving utilization of the capacity of repair enterprises, the 1979 plan calls for a further growth in the share of centralized repair of the main construction machines in comparison with the tasks expected to be carried out in 1978. The following level of centralized repair (ratio of the amount of overhaul done at plants as a percent of the total amount of repair of the machines) during 1979: single-bucket excavators 74.9, self-propelled scrapers 74.9, bulldozers 76.2, truck cranes 75.7, pneumatic-tired cranes 74, pipelayers 72.2 and truck graders 79.2.

In addition to the goals for level of centralized repair, the 1979 plan, for the first time, calls for the ministries to manufacture at subordinate enterprises experimental prototypes of nonstandardized operating equipment for repair enterprises, with a view to raising the technical level and reducing labor intensiveness in the repair of machinery.

Improvement in work organization and in truck utilization exerts a considerable influence upon construction progress. The 1979 plan establishes for the construction ministries and agencies goals for raising the utilization effectiveness of trucks, increasing the amount of haulage on trailers in accordance with advanced methods for shipping freight, and raising the technical level of automotive operation. Further improvement in the production outfitting of construction projects with materials and articles, making wide use of containerized and packaged shipment of building materials to facilities in accordance with the technology of erecting them, is of great importance in improving motor-vehicle utilization.

In accordance with the plan for 1979, the productivity of motor vehicles should grow by 4.5 percent in comparison with the level achieved in 1977 in tons per average listed-vehicle ton, and by 5.8 percent in ton-kilometers. Goals for truck productivity that have been established by individual ministries are shown in table 2.

Centralized freight hauling will be 59.1 percent in volume versus 57.8 percent in 1977. The amount of haulage in accordance with rational routing will increase. Freight hauling on automotive trailers will increase from 4.1 percent in 1977 to 4.7 percent.

The total number of diagnostic stations and posts in motor pools will increase in 1979 by 88, and flow lines for the technical servicing of vehicles will increase by 94. The capacity of the posts that have been equipped with engine pre-heaters for wintertime will

increase by 20,000 places for vehicles. It is planned to introduce into operation washers that are equipped for the repeat use of water and have a throughput of 25,500 motor vehicles. In 1979, in accordance with the plan, construction ministries and agencies should manufacture 4,530 units of specialized rolling stock for hauling construction freight.

With a view to supporting the preservation of freight and reducing idle time during loading and unloading by the precise and rhythmic shipment of construction freight to construction sites, the 1979 plan has introduced additional indices for the introduction of advanced methods for organizing haulage and drivers' work. Thus it has been planned to haul 46.4 percent of brick and small-piece wall materials to the construction ministries and agencies by packaging and on pallets. It is planned to haul 6.4 percent of the freight and 25.1 percent of the soil with use of the brigade contract. Of the total hauling of concrete and mortar, 25.7 percent should be hauled on clock schedules.

USSR Gosstroy has required construction ministries and agencies to work out and execute organizational and technical measures for reducing the amount of work done manually, raising the level of mechanization and automation work, introducing more effective work methods, improving the use of construction machinery and transport equipment within shifts and increasing the utilization thereof on shiftwork, improving the use of small-scale mechanization equipment, bringing order into the tooling activity, equipping brigades of workers with standard sets of equipment, improving the operation and repair of machines, and expanding the containerized and packaged hauling of freight. Such measures should be worked out to consider the specific conditions and available reserves of each construction organizations, based upon an analysis of the actual labor expenditures for executing the various types of labor-intensive work.

Table 2

Truck Productivity per
Average Listed-Vehicle Ton per Year

Ministry	Productivity	
	Tons	Ton-kilometers
USSR Minenergo	2,260	30,700
USSR Minvudkhov (organizations of union subor- dination)	1,380	29,560
USSR Mintyazhstroy	3,220	31,600
USSR Minpromstroy	2,770	32,130
Minneftegazstroy	1,560	37,000
USSR Minstroy	2,930	33,100
USSR Minsel'stroy	1,600	34,900
Mintransstroy	2,570	26,740
USSR Minmontazh- spetsstroy	960	25,920

Special attention was paid at the November CPSU Central Committee Plenum to the need for further growth in labor productivity. Fulfillment of the goals of the plan for comprehensive mechanization will help to raise the technical level of construction, to increase labor productivity and to fulfill the tasks set for capital construction for 1979.

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CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

PLANNING AND EVALUATION OF CONSTRUCTION ORGANIZATION ACTIVITY

Moscow FINANSY SSSR in Russian No 5, May 79 pp 39-43

[Article by L.I. Mazurin, Candidate of Technical Sciences and chief of the Technical Administration and member of the Board of USSR Stroybank: "Planning and Evaluation of Activity Based Upon Finished Construction Output"]

[Text] During the Tenth Five-Year Plan, an acceleration is expected to take place in the converting over to planning and evaluating the activities of construction organizations based upon the completed projects turned over to the customers and pilot complexes that have been prepared for the production of output or the rendering of services. In carrying out the decisions handed down during the 25th CPSU Congress, a number of construction ministries and departments -- Minpromstroy [Ministry of Industrial Construction] and Minmontazhspetsstroy [Ministry of Installation and Special Construction Work] of the Belorussian SSR, Minstroy [Ministry of Construction] of the Lithuanian SSR, Mintyazhstroy and Minmontazhspetsstroy of the Ukrainian SSR, Minstroy of the Uzbek SSR, Glavzapstroy [Main Administration for Construction in the Western Region] of USSR Minstroy, Glavmosinzhstroy of the Moscow Municipal Executive Committee and the Ryazan'stroy Association of USSR Minpromstroy [Ministry of Industrial Construction] -- converted over to accounts with the customers for commodity construction output for their entire programs. Commodity construction output -- is the estimated value of the SMR [stroitel'no-montazhnaya rabota; construction-installation work] required for the preparation of enterprises, phases, pilot complexes and projects for operations.

This great measure in the sphere of economics, finances, planning and the organization of construction production is being carried out within the framework and in accordance with the program and methods for the so-called Belorussian experiment.

At the same time, many other construction-installation organizations are settling their accounts with customers for the erection of dwellings and

municipal and cultural-domestic installations only after they have been turned over for operation and the acceptance documents approved by the state committees. In 1977, 96.3 percent of the overall volume of SMR carried out at all types of construction was paid for on the basis of the project as a whole (56.4 percent) and large technological stages. In civil housing construction, such accounting forms are used 98.1 percent of the time, including for completely finished projects -- 77.8 percent.

The accounts for a completed project in civil housing construction -- these are accounts for finished construction output, since the payment takes place following acceptance into operations by the state committee and approval of the acceptance document in the established manner. The accounting structure is somewhat different in production construction. Here payments are made mainly for work stages. They accounted for 52.3 percent of the estimated value of the SMR paid for by Stroybank for these projects in 1977. Moreover, for accounts in two stages -- 6.4 percent, in three -- 6.7 and in four or more stages -- 39.2 percent. The proportion of accounts based upon individual rates amounted to only 4.9 percent and for a project on the whole -- 42.8 percent. In the overwhelming majority of cases, accounts for a project on the whole are in fact accounts for fully completed SMR at projects where the equipment has not been adjusted or tested, the production of goods has not started and the project itself has still not been accepted by the state committee. Naturally, such projects should not be considered as finished output. The accounts for fully completed enterprises, phases, pilot complexes and individual projects turned over to customers and prepared for the production of goods or the rendering of services, in conformity with the approved plan, accounted for approximately three percent of the overall estimated value of the payments made for SMR carried out on production projects.

During 2 years of the Tenth Five-Year Plan, substantial qualitative changes took place in the structure of progressive accounts. The proportion of accounts for projects as a whole increased, while payments by stages decreased. Compared to 1975 when accounts for projects as a whole, for all types of construction, amounted to 41.8 percent, by 1977 the figure had already increased to 56.4 percent. For production construction the figures were 30.6 and 42.8 percent respectively and for non-production construction -- 61 and 77.8 percent. Moreover, the stages and projects increased considerably in scale in terms of their estimated costs.

The dynamics of accounts maintained for projects as a whole and for work stages during the 1975-1977 period are furnished in Table 1.

The union republics are increasing their use of accounts for finished projects, particularly in production construction. During the 1971-1977 period, these accounts increased by a factor of 17 in production construction in the Armenian SSR, in the Moldavian SSR -- by a factor of 7, in the Belorussian SSR -- by more than a factor of four and so forth (see Table 2).

TABLE 1

(1) (в % к общей стоимости оплаченных СМР)

Расчет (2)	(3) Годы		
	1975	1976	1977
(4) Всего оплачено за объект в целом и этапы работ	96.1	96.2	96.3
(5) В том числе:			
(6) за объект в целом	41.8	50.1	56.4
(7) в два этапа на объекте	11.4	9.0	7.0
(8) в три этапа	6.7	6.4	5.2
(9) в четыре и более этапов	36.2	30.7	27.7
(10) Из них по объектам производственного назначения оплачено за объект в целом и этапы работ	94.5	94.9	95.1
(5) В том числе:			
(6) за объект в целом	30.6	36.1	42.8
(7) в два этапа на объекте	7.5	7.8	6.4
(8) в три этапа	7.0	7.7	6.7
(9) в четыре и более этапов	49.4	43.3	39.2
(11) по объектам непроизводственного назначения	98.9	98.4	98.1
(5) В том числе:			
(6) за объект в целом	61.0	72.7	77.8
(7) в два этапа на объекте	18.2	10.8	7.9
(8) в три этапа	6.1	4.3	2.9
(9) в четыре и более этапов	13.6	10.6	9.5

Key:

1. (in % of overall value of SMR paid for)
2. Accounts
3. Years
4. Total amount paid for project and for work stages
5. Including:
6. For project as a whole
7. In two stages at the project
8. In three stages
9. In four or more stages
10. Of which: paid out for production projects for the project as a whole or for work stages
11. For production projects

The dynamics of introducing the accounts of the construction ministries, USSR Minenergo and the glavstroys (main construction administration) for Moscow, Leningrad, Kiev and Tashkent are shown in Table 3.

The past period, as shown in this table, is characterized by considerable consolidation and development of progressive accounts in production construction, particularly for projects taken as a whole. However, when compared against non-production construction, the level of the accounts for finished projects is still extremely low. Here we note the influence of many factors: the complicated nature of the projects erected, the individual nature of the draft space-planning and design solutions, the considerable number of modernized and re-equipped projects, unreliable estimated cost for SMR, the absence in a number of instances of planning-estimate documentation and so forth.

Meanwhile, many years of experience in the use of accounts for a project as a whole or for work stages have confirmed their great organizational and

TABLE 2

(1) (в % к сметной стоимости оплаченных СМР)

Союзные республики (2)	(3) Годы					
	1970		1973		1977	
	по объектам производст- венного назначения (4)	по объектам непроизводст- венного назначения* (5)	по объек- там произ- водствен- ного на- значения (4)	по объек- там произ- водствен- ного на- значения (6)	по объек- там произ- водствен- ного на- значения (4)	по объек- там произ- водствен- ного на- значения (6)
(7) РСФСР	20.0	78.3	29.3	56.2	40.8	74.0
(8) Украинская	24.2	78.3	31.4	69.5	44.2	84.8
(9) Белорусская	16.4	78.4	41.2	76.0	77.4	96.7
(10) Узбекская	13.7	72.4	29.9	68.1	41.6	69.9
(11) Казахская	15.7	60.0	26.5	61.5	35.8	82.2
(12) Грузинская	12.7	69.5	34.9	68.9	38.0	89.3
(13) Азербайджанская	14.6	55.5	36.1	64.7	44.6	89.7
(14) Литовская	63.3	91.5	41.8	87.6	82.9	96.1
(15) Молдавская	6.0	82.7	34.0	49.1	41.0	77.3
(16) Латвийская	14.6	85.4	22.0	50.5	44.4	81.3
(17) Киргизская	22.6	78.5	46.4	91.5	55.3	93.1
(18) Таджикская	24.8	81.2	30.6	70.9	36.1	77.7
(19) Армянская	3.7	31.1	65.3	81.2	63.4	89.5
(20) Туркменская	17.0	48.7	42.6	78.4	49.0	96.3
(21) Эстонская	38.7	92.0	38.5	70.4	36.0	75.4
(22) В целом по объектам, финансируемым Строй- банком СССР	20.1	76.7	30.6	61.0	42.8	77.8

(23) * Учтены только жилые дома.

Key:

- | | |
|--|---|
| 1. (in % of planned value of SMR paid for) | 13. Azerbaijan |
| 2. Union republics | 14. Lithuania |
| 3. Years | 15. Moldavia |
| 4. For production projects | 16. Latvia |
| 5. For non-production projects* | 17. Kirgizia |
| 6. For non-production projects | 18. Tadzhikistan |
| 7. RSFSR | 19. Armenia |
| 8. Ukraine | 20. Turkmenistan |
| 9. Belorussia | 21. Estonia |
| 10. Uzbekistan | 22. For projects on the whole,
financed through USSR Stroybank |
| 11. Kazakhstan | 23. *Only dwellings considered |
| 12. Georgia | |

mobilizational value for concentrating resources at pilot projects and upon the completion of stages which terminate certain types of work and open up a front for other types and also for achieving intermediate goals required for ensuring timeliness and a high level of quality in the final results.

The growth in accounts for finished output in civil housing and industrial construction is promoting an acceleration in such construction. Thus, in 1970 the proportion of accounts for finished projects and stages in industrial construction equalled 20.1 percent, whereas for a project as a

TABLE 3

(1) (in % of estimated value of SMR)

(3) Строительные министерства и главстрой	(2) Годы								
	1971			1975			1977		
	за объект в целом (4)	за этапы работ (5)	всего расчеты за объект в целом и этапы (6)	за объект в целом (4)	за этапы работ (5)	всего расчеты за объект в целом и этапы (6)	за объект в целом (4)	за этапы работ (5)	всего расчеты за объект в целом и этапы (6)
(7) Минтяжстрой СССР	4.0	17.5	21.5	21.6	71.5	93.1	32.8	63.3	96.1
(8) Минпромстрой СССР	6.5	20.6	27.1	33.8	65.1	98.9	53.6	45.5	99.0
(9) Минстрой СССР	7.6	23.6	31.2	30.4	67.9	98.3	43.0	54.6	97.6
(10) Минэнерго СССР	5.6	29.8	35.4	29.4	58.4	87.8	37.3	53.0	90.3
(11) Минтрансстрой	9.2	30.1	39.3	28.3	68.6	96.9	33.0	64.9	97.9
(12) Миннефтегазстрой	7.2	56.3	63.5	25.4	73.0	98.4	33.2	65.5	94.7
(13) Главмосстрой	3.4	20.8	24.2	24.6	69.0	93.6	46.0	49.4	95.4
(14) Главмоспромстрой (15) не существовал				24.9	71.1	96.0	17.9	74.4	92.3
(16) Главленинградстрой	10.0	70.1	80.1	37.7	57.9	95.6	49.7	44.8	94.5
(17) Главкиевгорстрой	15.6	47.5	63.1	44.6	55.4	100.0	54.1	45.9	100.0
(18) Главташкентстрой	14.5	3.1	17.6	57.2	41.8	99.0	80.0	19.8	99.8
(19) Главмособлстрой	5.4	33.5	38.9	36.6	63.4	100.0	54.3	45.7	100.0
(20) Всего по объектам, финансируемым Стройбанком СССР	7.3	27.2	34.5	30.6	63.9	94.5	42.8	52.3	95.1

Key:

- (in % of estimated value of SMR paid for)
- Years
- Construction ministries and main construction administrations
- For project as a whole
- For work stages
- Total number of accounts for project as a whole and work stages
- Mintyazhstroy USSR
- Minpromstroy USSR
- Minstroy USSR
- Minenergo USSR
- Mintransstroy
- Minneftegazstroy
- Glavmosstroy
- Glavmospromstroy
- (did not exist)
- Glavleningradstroy
- Glavkiyevgorstroy
- Glavtashkentstroy
- Glavmosoblastroy
- Total for projects financed through USSR Stroybank

whole -- five percent of the estimated value of SMR paid for and in 1977 the figures were 95.1 and 42.8 percent respectively. During this same period, the average actual length of time required for the erection of production projects decreased from 6.8 to 5.2 years (see Table 4). This represented a substantial gain for the national economy in the form of output of fixed productive capital being placed in operation. In addition, a reduction in the volumes of unfinished construction is raising the effectiveness of capital investments, while a lowering of overhead expenses is reducing the costs for SMR.

Minpromstroy [Ministry of Industrial Construction] and Minmontazhspestroy [Ministry of Installation and Special Construction Work] of the Belorussian SSR, in carrying out an experiment concerned with further improving the

TABLE 4

Годы (1)	Средняя фактическая продолжительность строительства, лет (2)	Удельный вес расчетов за объекты в целом и этапах (в % к общей стоимости выполненных СМР) (3)	
		всего (4)	за объект в целом (5)
1970	6.8	20.1	5.0
1971	6.6	34.5	7.3
1972	6.3	66.0	11.3
1973	5.9	87.7	16.7
1974	5.6	93.1	23.6
1975	5.4	94.5	30.6
1976	5.3	94.9	36.1
1977	5.2	95.1	42.8

Key:

1. Years
2. Average actual duration of construction, in years
3. Proportion of accounts for project as a whole and stages (in % of estimated value of SMR paid for)
4. Total
5. For a project as a whole

planning for production-economic activity, are settling their accounts with customers, as already mentioned, for commodity construction output since 1976. During the past 3 years, the tasks established in the plans for the republic's Minpromstroy, for this important index, were over-fulfilled. Approximately 200 production capabilities and projects representing a commodity output volume in excess of 100 million rubles were placed in operation ahead of schedule or in excess of the plan. This included such large enterprises as the Mikashevichi Crushing-Sorting Plant (delivered 1 quarter ahead of schedule), the Trud Shoe Factory in Gomel' (2 months earlier than scheduled), capabilities for the production of 200,000 tons of potassium fertilizers at the Belarus'kalyi Combine (100,000 tons placed in operation during the 1st quarter and 100,000 tons during the 3d quarter, against a plan calling for such capabilities to be placed in operation during the 4th quarter of 1977). At the same time, the volume of unfinished construction is decreasing in a steady manner.

In the Lithuanian SSR, where earlier use was made of accounts for finished projects than in the other republics and where the level of such accounts has been higher during the past 10 years, the experience accumulated has assisted the contractual organizations in converting over more rapidly to the new methods for planning and the economic stimulation of construction production. In 1977 the republic's Ministroy also converted over completely to the new system for management and accounting for commodity construction output. As a result, the proportion of accounts for projects as a whole and for commodity construction output, during 1977 alone, increased from 77.8 to 90.1 percent in the Lithuanian office of Stroybank. In particular, the proportion for production construction in 1977 was 82.9 percent, including 31.2 percent for commodity construction output.

It bears mentioning that Minstroy for the Lithuanian SSR fulfilled its 1977 task for the delivery of commodity construction output, based upon general contract work, by 102 percent (using its own resources -- by 105 percent) and in terms of the volume of SMR -- by 92 percent, with a decrease being reflected at the end of the year in the volume of unfinished construction compared to the end of 1976. During this period the number of overdue bank loans decreased by a factor of 3.5. Capabilities were placed in operation ahead of schedule at the Kauno Baldai Furniture Factory in Kaunas, at the Utyanskiy Brewery and at other enterprises and projects.

The increased use of accounts for commodity construction output, in addition to other measures, helped to accelerate by 2-3 months the erection of complexes for the production of nitrophoska and weak nitric acid at a nitrogen fertilizer plant in the city of Jonava and also a footwear department at the Vil'nyus Association imeni Eydukyavichyus.

Having accumulated a considerable amount of experience in this particular field, the construction ministries and departments and their contractual organizations are displaying increasing interest in accounts for finished construction output and they are stimulating interest among the completion organizations in this regard. The technical-economic indices for the work of construction organizations which receive prefabricated structures and parts and which pay fully for delivered sets, for a project as a whole or for a large technological stage, confirm the effectiveness of this new form for ensuring that construction is supplied with the required material resources. Such inter-relationships raise the level of engineering preparations for construction, reduce the duration and cost of the work and unproductive expenditures and supplies of material values at the construction sites and they accelerate the placing in operation of capabilities and fixed capital.

The extensive use of such a system of technological completion work was promoted by the "Recommendations for Organizing and Making Payments for Complete Deliveries of Construction Structures and Parts" of Gosstroy, Gosbank and USSR Stroybank. These recommendations were sent, for the purpose of being introduced into operations, to the union construction ministries and also to those ministries and departments engaged in carrying out contractual work and in the production of construction structures and parts, to the councils of ministers of the union republics and to the institutions of Gosbank and USSR Stroybank. The recommendations reveal the principles for organizing the production-technological completion of construction projects using prefabricated structures and parts, the structure and functions for controlling complete deliveries, the basis for inter-relationships between the industrial, completion and construction organizations and the maintenance of accounts for complete deliveries.

It was recommended that a completion trust (administration) or an industrial completion trust (association) be assigned as the main completion organ. It must be the centralized customer and the purchaser of products from the

industrial enterprises and it must serve as the general supplier as far as the construction organizations are concerned. The inter-relationships between the completion organization and the industrial enterprises on the one hand and the construction organizations on the other are predicated upon the principles of economic agreements, with all of their attendant obligations, rights and responsibilities.

The tasks of the completion trusts (administrations) and the industrial-completion trusts (associations) include the centralized development and implementation of plans for complete deliveries of reinforced concrete and metal structures, carpentry products and local construction materials to the construction projects and also the maintenance of accounts for the materials delivered. They bear material responsibility before the construction-installation organizations and industrial enterprises for the completeness of deliveries. Within the construction-installation organizations (trusts, combines, associations), the complete deliveries of construction structures, products and materials, in strict conformity with the work technology and schedules, is a function of the UPTK's [upravleniye proizvodstvenno-tekhnologicheskoy komplektatsii; production-technological completion administration].

The inter-relationships between a UPTK and a completion trust (administration) or an industrial-completion trust (association) are determined by their functions as a customer (purchaser) and supplier. The inter-relationships between the industrial enterprises -- producers of the construction structures and parts -- and a completion trust (administration) are determined by their functions as a supplier and customer (purchaser). The inter-relationships of industrial enterprises with a UPTK are determined by their functions as a consigner and consignee.

The technological set includes a grouping of structures, parts and materials required for building the project, building or installation or for carrying out a work stage. The technological set for large projects (buildings, installations) can consist of a grouping of structures, parts and materials required for an enlarged work complex or a spatial element of a project (story, floor, span, section), suitable for the technology employed in the construction-installation process and for the contractual relationships between the general contractor and the specialized organizations -- the sub-contractors.

The structure and size of the technological set are determined based upon design and technological principles and also upon the need for accelerating the placing in operation of the projects and pilot complexes. The prefabricated structures, parts and materials of a set must ensure the erection of structures having spatial firmness and completeness in the 3-dimensional element, the portions of a building, installation and engineering network and they must ensure in terms of their quantity and size that SMR is carried out on a continuous basis in accordance with the technology adopted in the plan. The parameters of the technological set

are established by the contractual and completion organizations. It can be divided up into a number of delivery (plant) sets, with the organization of the timely delivery of such sets from industrial enterprises being entrusted to a completion trust (administration) or industrial-completion trust (association).

The delivery (plant) set -- a part of the technological set -- is supplied to a project by a producing-plant or a production-completion base of a UPTK, in conformity with the technology and schedules for carrying out the SMR and based upon operational completion schedules. It is paid for by the completion organization following the complete delivery to the construction site or UPTK base of the structures and parts comprising the set, as called for in the delivery agreement or the document which replaces the latter. The payment for the technological sets is carried out by the UPTK upon the completion by all of the enterprises of their deliveries to the construction site (in some instances -- to the UPTK base) of all of the structures and parts comprising the set, as called for in the delivery agreement or the document which replaces the latter.

When accounting for the delivery of sets by the completion organizations, their expenses for delivering the technological sets, from the moment that the completion organization pays the enterprise for the first delivered (plant) set up until the time it presents the construction organization with the payment requirement for the full cost of the technological set, are covered by the internal working capital of the completion organization and by bank credit.

Experience has shown that a concentration of the resources of the builders and interest on the part of the completion organizations in the final result will greatly aid in achieving that result more rapidly. Thus it is obvious that a need exists for spreading the principles of accounting for finished construction output to those organizations responsible for supplying construction with material-technical resources and for transporting them.

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CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

PROBLEMS OF MODULAR HOUSING CONSTRUCTION DISCUSSED

Moscow BYULLETEN' STROITEL'NOY TEKHNIKI in Russian No 5, May 79 pp 26-27

[Article: "Concerning Modular Housing Construction"]

[Text] Gosgrazhdanstroy, with the participation of interested organizations, has examined the question of the results obtained from the construction and operation of plants for modular housing construction, the construction of buildings using modular units and the carrying out of a complex of planning and scientific-research operations.

In the resolution finally adopted, mention was made of the fact that a number of ministries and departments and scientific-research, planning, production and construction organizations have carried out a considerable amount of work in developing plans for dwellings made using monolithic reinforced concrete modular units, in planning and building enterprises for their production, in developing new structures and in the building of modular housing buildings.

During the course of developing modular housing construction, a complex of scientific-experimental studies was carried out, improvements were realized in the architectural-planning solutions for buildings and their structures and corrections were introduced into the technological parameters and design solutions for the non-standardized equipment of plants.

On 1 January 1979, there were 20 modular housing construction enterprises in operation throughout the country, representing a total planned capability of 1.33 million square meters of overall space annually. Commencing in 1969, existing enterprises have built more than 1,000 dwellings and public buildings representing a total area of approximately 3 million square meters of space in various regions of the country. Thus the feasibility of modular housing construction and its technical validity have already been established. This trend in residential housing has departed the stage of experimental checking and entered the stage of industrial development.

At the same time, Gosgrazhdanstroy has indicated that serious shortcomings took place during the development of modular housing construction. For

example, USSR Minstroy [Ministry of Construction] failed to build three enterprises as called for in the plan, USSR Minpromstroy [Ministry of Industrial Construction] -- 3, USSR Minsel'stroy [Ministry of Rural Construction] -- 7, USSR Mintyazhstroy [Ministry of Heavy Construction] -- 3 and Glavmosoblstroy [Main Administration for Construction in Moscow Oblast] -- 1. The coefficient of use of production capabilities (compared to the planned-figure) on 1 January 1979 amounted to approximately 50 percent.

The leading modular housing construction enterprises of USSR Minpromstroy in Minsk and Kremenchug and of USSR Mintyazhstroy in Khabarovsk and Vologda were placed in operation with considerable construction imperfections and insufficient technological equipment and this adversely affected the development of the capabilities of these enterprises.

The actual operational indices of the housing construction enterprises placed in operation were considerably lower than the planned indices. This applied to the specific capital investments per unit of output, specific metal-intensiveness and the cost of technological equipment, plant labor intensiveness and output production costs.

In the majority of instances, the dwellings built using modular units produced by plants have worse indices for overall labor expenditures (under plant and building conditions) and also for steel and cement expenditures than those for similar large-panel dwellings.

At the same time, the feasibility of developing modular housing construction as one of the forms for industrial housing construction is adequately confirmed by the economic indices for work carried out at the Krasnodar Plant of USSR Minpromstroy. The indices, according to data supplied at the end of 1978 by the Krasnodar Housing Construction Trust and a modular housing construction plant, are as follows:

...output production volume approached the planned capability -- 110,000 square meters;

...level of plant readiness reached 74 percent;

...total labor expenditures amount to 23.6 man-hours per square meter, including: 19.5 man-hours per square meter at the plant and 4.1 man-hours per square meter at the construction site;

...during the construction of individual buildings, a reduction of 2-2.5 times was achieved in the duration of construction compared to the norms for large-panel homes.

The decision handed down by Gosgrazhdanstroy recognized the need for requesting those ministries and departments to which the modular housing construction enterprises were subordinate, with the participation of the scientific-research and planning organizations, to concentrate their

principal attention during the 1979-1980 period on improving the work of existing enterprises and perfecting modular housing construction so as to ensure that these enterprises achieve maximum possible improvements in their technical-economic indices for production.

In order to ensure that the mentioned work is completed, USSR Minpromstroy, USSR Mintyazhstroy, USSR Minsel'stroy, USSR Minenergo, Minaviaprom [Ministry of the Aircraft Industry], USSR Minugleprom [Ministry of the Coal Industry] and Roskolkhozstroyob'yedineniye must carry out, jointly with the planning organizations and the local departments for construction and architectural matters and with the participation of TsNIIEP zhilishcha [Central Scientific Research and Planning Institute of Standard and Experimental Planning of Housing], a technical inventory of the actual status of all of the production stages of enterprises, reveal the optimum capabilities of enterprises and develop measures for their development. Moreover, principal attention should be given to perfecting the technology and improving the quality of the units and to the methods to be employed for plant finishing work involving the use of new, modern and efficient heat-insulating and finishing materials, while bearing in mind the need for achieving the planned technical-economic indices.

The need is recognized for intensifying scientific-research and planning work during 1979 and 1980 in the field of modular housing construction and ensuring that this work is directed mainly towards furnishing technical assistance to existing modular housing construction plants and perfecting existing series of experimental plans for modular housing units. During 1979 and 1980 the planning organizations responsible for the corresponding trends in modular housing construction must carry out the conversion of the experimental series into standard ones for each technical trend (for a group of similar type modular housing construction plants), while using in the process the results of experimental construction and bearing in mind further improvements in the architectural solutions for modular housing dwellings reducing steel and other material expenditures and achieving the best indices for labor intensiveness and plant readiness.

During the course of developing a task for Giprostrommasy [All-Union State Planning and Design Institute of the Giprostroyindustriya] for the carrying out of a plan for a modular housing construction plant, in conformity with the plan for experimental planning of USSR Gosstroy, the Administration for Completely Prefabricated Housing Construction, New Equipment and Economics and the Administration for Housing Construction must review the use of the more progressive technical solutions for machines and equipment which have undergone production checks at existing modular housing construction enterprises.

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CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

CONSTRUCTION WORK IN CITY OF DUSHANBE

Moscow BYULLETEN' STROITEL'NOY TEKHNIKI in Russian No 5, May 79 pp 31-32

[Article by A.M. Priyev: "In Gosstroy for the Tadzhik SSR"]

[Text] Concerning the building-up of the city of Dushanbe. At the present time, 75 percent of the entire population of Tadzhikistan lives in valleys which, in terms of area, occupy only 7 percent of the territory. The population density in the valleys is 100-150 persons per square kilometer, in the mountainous regions -- 5-7 and in the Pamir region -- less than one person per square kilometer.

Those valleys having relatively mild reliefs and good water sources are utilized for highly productive irrigation farming. The republic's industry, which initially specialized in the processing of agricultural products, is also distributed in valley regions. The mild relief made it possible to build railroads and airfields and it facilitated the construction of buildings and engineering networks. All of the republic's principal cities developed and grew at an intensive pace in the valleys.

The growth in the cities of Tadzhikistan, conditioned by the powerful development of industry based upon unique supplies of water power and minerals, is constantly in conflict with the interests of agricultural production. The development of the cities and the construction of industrial projects, transport enterprises, highways and electric power transmission lines are invariably associated with the withdrawal of valuable agricultural lands. For the republic as a whole, 9,100 hectares of agricultural land, included 1,700 hectares of irrigated land, were withdrawn for construction purposes during the 1971-1975 period. In the vicinity of Dushanbe alone, 660 hectares of land were withdrawn during this period. At the same time, the hills adjoining the city of Dushanbe occupy more than 5,000 hectares.

In connection with the intensive development of the Southern Tadzhik Territorial Production Complex, considerable growth is expected in those cities comprising the Dushanbe group settlement system. By the year 2000,

the population of Dushanbe is expected to reach 750,000-800,000 persons (at the present time, it is 500,000 persons). This figure provides the basis for the computations embodied in the new general plan for Dushanbe, developed at the Dushanbegiprogor Institute.

The most important problem resolved in the new general plan for the city is its territorial growth. It is practically surrounded on three sides by flat terrain on which irrigation farming prevails. The foothills of the Gissarskiy mountain ridge extend to the city only in its northeastern and partially its northwestern portions.

The inability to obtain additional large land areas suitable for irrigation has confronted the scientific-research and planning organizations of the republic with the task of studying the technical possibility and economic feasibility of building-up the hilly territories, consisting of sagging soils of considerable vigor and high seismic activity. The Central Asian Branch of the Scientific-Research Institute of Foundations and Underground Installations of USSR Gosstroy was designated the leading executive agent and the Dushanbe Complex Department of TashZNIIEP and the Tadzhik State Institute of Engineering-Technical Studies of Gosstroy for the Tadzhik SSR -- the co-executive agents.

It bears mentioning that sufficient examples can be found in both foreign and domestic experience of extensive construction work being carried out under relief conditions of varying degrees of complexity. This includes certain cities in the Far East, the Caucasus, Crimea, Ukraine, cities in France and Latin America, where the relief conditions are combined with just one of the complicating factors, for example, the sagging of soils or the seismic activity. Examples of planning and construction being carried out in connection with combining relief and seismic activity under warm climate conditions are to be found in Georgia and Armenia. In certain southern regions of the Ukraine, such construction work has been carried out under conditions involving the combining of relief having sagging soils with low seismic activity. However the problem of planning and construction under conditions involving the combining of relief having sagging soils with seismic activity of nine points and in a warm climate is being solved for the very first time.

As a rule, the building-up of a territory having complex sagging soils involves the preparation of footings using various methods, in the interest of eliminating the sagging properties of the soils throughout the entire sagging thickness. The method of preliminary wetting is considered to be the most effective and economically most feasible method for preparing footings and it has been developed extensively throughout the republic. However, although the use of this method eliminates the sagging properties of the soils, it also brings about a sharp increase in the moisture content and, as a result, a reduction in the structural firmness of the soils and an increase in the seismic effect during an earthquake. The mentioned factors promote the development of landslides; this has been borne out by

the results of a micro-seismic investigation of territories having complex reliefs consisting of loess-like soils. Thus full-scale studies were carried out during the first stage in connection with determining the stability of the slopes consisting of sagging soils, during moisture and dynamic (seismic-explosive) effects.

Based upon these studies, appropriate recommendations were developed containing the computed parameters for seismic effects up to nine points and a computational system for evaluating stability was proposed.

The next stage in these investigations consists of a study of the work of different types of foundations for sagging soils, complex relief and high seismic activity, in the interest of establishing the type of foundation that will best ensure the reliability and operational suitability of buildings and installations under the conditions mentioned.

In order to solve this task, a 4-story building consisting of five sectional units each measuring 15 X 12 meters and 13.5 meters high (four levels) was built on a slope having a steepness of 18-20° and consisting of sagging soils 15 meters in thickness. The above-ground portion of the building was planned for a prefabricated IIS-04 Series framework having hinged wall panels. The sectional units were erected on different foundations: continuous (two sections), columnar (monolithic reinforced concrete housings), solid monolithic ribbed slab and suspended pilings. The building was erected without partitions, floors and other elements, the weight of which is replaced by an equivalent layer of ballast placed upon the floor slabs. The ballast also serves as a useful and temporary workload.

In order to reveal the effects of the stiffness of the framework on the operation of the foundations and the base, a strong variant is planned for the sectional unit on a continuous footing. Distinct from the other units, a requirement exists here for interior brick walls and hinged wall panels are substituted for enclosing structures in the column plane.

The elimination of the sagging properties of soils is achieved through use of the pre-building wetting method, in accordance with the standard system and with no pre-packing of the soil in the upper portion. Dynamic effects which simulate an earthquake are created using seismic-explosive waves. The intensity of the seismic activity according to the Medvedev Scale was 8-9 points. Control over the behavior of the slope and the sectional units on different foundations was achieved using such methods as seismometry, strain measurements, topographical geodesy and engineering-geological observations.

Based upon the theoretical and full-scale studies carried out, an instruction is being developed for the selection of rational types of foundations for buildings and installations to be erected on sagging soils under conditions of high seismic activity and complicated relief.

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CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

RECENT DEVELOPMENTS IN GOSSTROY FOR THE KIRGIZ SSR

Moscow BYULLETEN' STROITEL'NOY TEKHNIKI in Russian No 5, May 79 pp 32-33

[Article by A.N. Korgan: "In Gosstroy for the Kirgiz SSR"]

[Excerpts] Concerning the building-up of villages. Gosstroy for the republic has examined the question of measures for raising the quality of individual dwelling construction and implementing improvements in the building-up of villages throughout the republic. The participants at a meeting discussed the shortcomings noted in the building-up of villages and they handed down a number of proposals. It was mentioned that one shortcoming in the work of transforming rural populated points into modern and well organized settlements is the absence at many central settlements of sovkhoses and kolkhoses of plans for the planning and building-up of such settlements.

During this meeting, emphasis was placed upon the fact that the construction of individual dwellings must be carried out on the basis of standard plans requiring the use of all types of engineering equipment. But the number of plans available for the building of individual dwellings is still insufficient. Taking into account the planning experience that is available throughout the country and the national requirements of the population in the various regions of Kirgizia, additional plans for the building of individual dwellings must be developed. The planning for dwellings must provide for the inclusion of ground floor basements (in addition to increasing the density of a housing system, basements also raise the seismic stability of dwellings) and the presence of farmsteads and outbuildings, including for the summer period. These plans must be formulated in the form of albums and circulated extensively.

During the meeting, special attention was given to those problems concerned with the reliability of individually built dwellings under conditions involving seismic danger. The proposal was made to implement improvements in the sale of construction materials to the population, including those which strengthen the seismic stability of buildings (cement, brick, wood, metal) and also metal products. Mention was made of the need for providing

the rural population with training in the principal requirements for the earthquake-proof construction of individual dwellings.

It was proposed that the cooperative construction of dwellings, a progressive type of construction and one which ensures the rapid erection of reliable and modern dwellings for rural workers, be developed in villages throughout the republic. The plans call for an expansion in the construction of buildings for the sphere of domestic services.

During the meeting, special emphasis was placed upon the need for raising the role and responsibility of the architectural-construction service of the executive committees of local soviets of people's deputies for the quality of individual dwelling construction. In some regions of the republic, proper attention is not being given to the selection and retention of engineering personnel.

Based upon the results of the meeting, Gosstroy for the republic adopted a resolution calling for specific measures to be carried out in connection with the problem under review.

Concerning the general plan for the city of Przheval'sk. In accordance with a task assigned by Gosstroy for the Kirgiz SSR and coordinated with interested ministries, departments and soviet organs, the general plan for the city of Przheval'sk, developed by Kirgizgiprostroy Institute, has been examined by the City-building Council of Gosstroy for the Kirgiz SSR.

The general plan calls for Przheval'sk to be developed as a multi-functional cultural-administrative and industrial center in Issyk-Kul'skaya Oblast and a center in the eastern sub-region of the Issyk-Kul'skaya Oblast resort area, the population of which will reach 125,000 persons by the year 2000.

Existing and planned industrial enterprises and construction bases, the growth of which is associated with a considerable increase in the volumes of civil construction and transport shipments, will constitute the economic base for the city's development. The plans call for an expansion to take place in the network of higher and secondary educational institutes and public health institutions of oblast subordination and also in the organization of tourism and mountain climbing.

The draft general plan calls for the functional zoning of the city's territory into a settled zone and northern and southern industrial-warehouse regions. The settled territory is divided into four housing regions. An increase will be achieved in the density of the housing build-up through the modernization of the existing fund of single-story dwellings. The architectural-planning solution for the city is based upon the existing network of streets, the organization of the administrative-public center, the principal arteries and upon the planting of shrubs and

trees. The plans call for the housing build-up to be carried out on the basis of large blocks. The problems of engineering support for the city have been worked out in the plan. The creation of district roads is required for transit transport operations.

The City-Building Council has for the most part approved the draft general plan for Przheval'sk and it has recommended that Kirgizgiprostroy Institute, following revision and appropriate coordination, present the general plan to Gosstroy for the Kirgiz SSR for its review.

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CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

REGIONAL PLAN FOR SETTLEMENT OF THE ARMENIAN SSR

Moscow BYULLETEN' STROITEL'NOY TEKHNIKI in Russian No 5, May 79 pp 34-35

[Article by G.S. Avanesyan: "Concerning a Regional Plan for the Settlement of the Armenian SSR"]

[Text] Gosstroy for the republic has examined a regional plan for the settlement of the Armenian SSR as developed by the Armgosproyekt Institute of Gosstroy for the Armenian SSR, the Scientific Research Institute of Economics and Planning of Gosplan for the Armenian SSR, Armgiprozem of the Ministry of Agriculture for the Armenian SSR and ArmNIISA of Gosstroy for the Armenian SSR. An RSR [regional'naya skhema rasseleniya; regional plan for settlement] is a scientifically developed pre-planning concept for improving the settlement of the republic. It calls for the solving of large settlement problems associated with raising the standard of living of man, improving living, recreation and working conditions and also making more rational use of the republic's land resources.

A regional plan for settlement which provides for the creation of city-building conditions for the comprehensive development of man's vital activities is directed towards the formation of a regional system of populated points which will ensure the best conditions for living and overall development; the creation of settlement conditions which actively promote the development and distribution of the productive forces in a region; the selection of trends for the development of populated points in a region that will promote the sanitation of the environment.

A special purpose programming approach method is employed in an RSR. The methodological principles underlying the development of an RSR are conditioned by the objective socio-economic role played by settlement in a developed socialist society, while taking into account the potential of city-building for completely solving the social, economic and ecological tasks of social development. Moreover, regional settlement is viewed as an organized system of mutually associated municipal and populated areas which are closely bound to the economic and ecological system of the region.

The initial materials used in preparing the RSR included the "Principal Trends for Developing the National Economy of the USSR During the 1976-1980 Period," as approved during the 25th CPSU Congress; the general plan for settlement on the territory of the USSR; the plan for the development and distribution of the productive forces of the Armenian SSR; the general plan for the rational use of land resources in the Armenian SSR; plans and systems for rayon planning and the general plans of cities; analytical and forecasting developments which contain materials for use in solving long-range settlement problems.

Methodological guidance in the development of the RSR was furnished by the TsNIIP for City Construction and Gosstroy for the Armenian SSR. The republic's Gosstroy approved the settlement plan as presented.

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CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

ALL-UNION CONFERENCE ON CONSTRUCTION OF LARGE-PANEL WOODEN BUILDINGS

Moscow BYULLETEN' STROITEL'NOY TEKHNIKI in Russian No 5, May 79 pp 41-42

[Article: "All-Union Conference on the Construction of Large-Panel Wooden Buildings"]

[Excerpts] An all-union scientific-technical conference on the subject of "Progressive Types and Structures for Large-Panel Dwelling and Public Wooden Buildings Having a Limited Number of Floors and Experience in Producing them" was held in Riga in December 1978. The conference was organized by Gosgrazhdanstroy, USSR Minlesprom [Ministry of the Lumber Industry], Gosstroy and Minsel'stroy for the Latvian SSR, Latkolkhozstroy and the central and Latvian administrations of the NTO [Scientific and Technical Department] of the construction industry. The following participated actively in the preparations for and the actual work of the conference: USSR Gosplan, Minstankoprom, Gosstroy for Latvia and Estonia and also representatives from a number of ministries and departments of leading scientific-research and planning institutes. In all, more than 200 individuals participated in the work of the conference.

The work of existing enterprises for the production of wooden houses, subordinate to USSR Minlesprom, Mintransstroy [Ministry of Transport Construction], Litmezhkolkhozstroy, Roskolkhozstroyob'yedineniye, Latkolkhozstroy and others, was analyzed during the course of the conference. The problems concerned with the manufacturing, at plants of Minstankoprom, of highly productive equipment for the production of wooden houses were reviewed. Discussions were held on improving the structures used for large-panel wooden houses, on the methods available for developing new and economic plans for housing and public buildings and on organizing the transporting and construction of houses made from large-size panels. A discussion was also held on the need for reviewing the fire-prevention and other planning norms for houses of the farmstead type.

For those who participated in the conference, trips were organized to the Livany EDSK, which produces large-panel houses using chip-board slabs and to construction sites in the cities of Sigulda and Livany, where housing

developments are springing up based upon houses produced at the Livany EDSK. The principal technological processes for the production of houses at this combine have been completely automated.

As a result of having discussed reports and messages and having acquainted themselves with the construction of large-panel wooden houses and other effective materials, those who participated in the conference adopted recommendations aimed at improving the quality of planning and construction for wooden buildings having a limited number of floors and accelerating the introduction of leading scientific and engineering achievements into completely prefabricated housing construction based upon the use of wood and other effective materials.

In particular, it was noted in the recommendations that the organizations of USSR Minlesprom and a number of other ministries and departments had performed a certain amount of work in connection with the development of completely prefabricated housing construction (houses with a limited number of floors) using wooden and other effective structures. For example, large housing construction enterprises having modern equipment at their disposal for the production of large-panel houses have been created or are in the process of being created in USSR Mintyazhstroy [Ministry of Construction of Heavy Industry Establishments], USSR Minlesprom, Roskolkhozstroyob'yedineniye, Latkolkhozstroy, Litmezhkolkhozstroy and in a number of other organizations. New standard plans for completely prefabricated housing and public buildings are being developed by the planning, scientific-research organizations of Gosgrazhdanstroy and USSR Minlesprom.

Available foreign and domestic construction experience confirms the technical-economic feasibility of employing plant-produced, completely pre-fabricated wooden buildings for state, cooperative, kolkhoz and individual construction in the rural areas.

At the same time, the following facts surfaced during the conference:

...the plant production volumes for wooden houses (having a limited number of floors), especially completely prefabricated panel houses, are still inadequate and, as a result, housing construction in the rural areas is being carried out mainly using non-industrial methods, with heavy reinforced concrete structures predominating in completely prefabricated housing construction;

...the production of new and effective materials and modern equipment for houses is not keeping pace with the requirements of housing construction in terms of volume, nomenclature and quality;

...the production of items is often carried out at non-specialized enterprises and, as a result, the quality of the items in many instances does not meet the requirements set forth in the norms and standards and the

labor intensiveness and cost of these items are high. A considerable portion of the houses under construction possess an insufficient degree of plant readiness;

...very little attention is being given to scientific-research, experimental-design and experimental work in the sphere of structures, technology and the economics of completely prefabricated housing construction based upon the use of wood and other effective materials. Nor is this work being coordinated properly;

...the technical requirements and normative documentation are not taking into account sufficiently the specific nature of single-apartment houses having a limited number of floors.

In the interest of increasing the construction volumes for completely prefabricated large-panel wooden buildings having a limited number of floors and at the required quality and technical-economic levels, the conference considered it necessary to submit requests and proposals to USSR Gosstroy, Gosgrazhdanstroy, USSR Minlesprom, the construction ministries and departments, the gosstroys for the union republics and also to the republic mezhkolkhozstroys [interkolkhoz construction organization]. The carrying out of these proposals will make it possible to further develop scientific-research and planning work, to introduce the results of such work into construction practice more rapidly and to develop the production base for industrial housing construction (of houses having a limited number of floors).

During the conference, emphasis was placed upon the need for developing and approving, for state, kolkhoz, cooperative and individual construction and for various climatic regions of the country, standard plans for single and 2-story plant-produced wooden dwellings and for composing a catalogue of standard structures, wall panels, floor surfaces, carpeting and other elements and parts for wooden houses; for developing standards for large-panel wooden houses having a limited number of floors and also devices and units for decentralized engineering equipment systems; the introduction of effective methods for erecting plant-produced wooden large-panel houses. Emphasis was placed upon the need for the series production of complex and highly productive automated technological lines for delivery to enterprises having different capabilities and engaged in the production of large-panel structures for buildings having a limited number of floors and made using wood and wood materials; the development and production mastering of effective construction and finishing materials which will satisfy the requirements of wooden housing construction of houses having a limited number of floors, engineering equipment systems and progressive technological processes, equipment and instruments for the plant production of houses.

Those who participated in the all-union conference expressed the confidence that all manual workers, engineering-technical personnel and office

workers will participate actively in carrying out the recommendations aimed at fulfilling the tasks established during the 25th CPSU Congress and the July (1978) Plenum of the CC CPSU with regard to the socialist transformation of the villages and rural areas of our country.

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CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

EXPERIMENTAL CONSTRUCTION AND USE OF UNDERGROUND FACILITIES

Moscow STROITEL'NAYA GAZETA in Russian 20 Jun 79 p 3

[Article by I. Ivanova, chief engineer in the Scientific-Technical Department of the Administration for the Planning of a Model Housing Region for the Future and L. Kiryushina: "Underground Levels"]

[Text] The complete use of underground space represents only a portion of the vast experimental program conceived at Chertanov Severnyy. It is still the country's only experimental housing region under construction. According to data supplied by Gosgrazhdanstroy, similar large-scale urban development experiments will be carried out in the near future in such regions as Mesherskoye Lake in Gor'kiy, Krylatskoye in Moscow, Kal'kauz in Tashkent, Teremki in Kiev, Stepnoy in Karaganda and in other cities.

If somebody wished to inspect the underground installations of Chertanov Severnyy, a considerable amount of time would be required to do so in view of the fact they occupy almost 10 hectares. The lion's portion of this area consists of garages -- there are more than 2,500 of them here (one for every two families).

According to estimates by specialists attached to NIIES [Scientific Research Institute of Economics of Construction] of USSR Gosstroy, the cost for building the garages and transport, power engineering and engineering installations above ground would have been approximately 8 million rubles. The construction costs for building them below ground exceeded the above figure by two and a half times.

It would appear that the comparison does not favor underground urbanization. However the scientists believe that an evaluation of this nature must take into account the complete economic effect, the manifestation of which takes many forms. For example, the elimination of "municipal zones" releases up to seven percent of the territory in the area, or 16.4 hectares (from a cost standpoint, this amounts to approximately 8 million rubles). Such an action would make it possible to raise the density of the building system, realize considerable improvements in public welfare -- the creation of a proper

combination of squares, boulevards and courtyards. The quality of the environment is improving owing to the absence of noise and gaseous conditions. At the same time, pedestrians are being guaranteed complete safety. In short, the social benefits to be realized from the underground installations are beyond dispute and they will pay off their own construction in seven and one half years. The plans call for several types of vehicle parking areas to be built at Chertanov Severnyy. A new design method is that of building garages in the foundations of buildings. In the second housing complex, a monolithic foundation is penetrated on two sides by cylindrical empty-stalls for automobiles. In the sixth complex a monolithic foundation slab serves as the floor of a garage and the walls and ceilings were assembled using the same structures as used on the above-ground portion of the building. In both variants the sectors adjoining the foundation are covered by prefabricated vaulted arches having a span of 14 meters. The facilities formed by them are to be used as a throughway, for vehicle maneuvering and also for additional parking space.

In a group of 25-story panel buildings having a narrow spacing between the transverse walls, garages will be installed under the service facilities attached to these buildings. And finally, the parking areas for a 30-story building having a monolithic core and a developed plan configuration were arranged in a 2-story encircling building.

One unique underground installation is our REB [rayonnyy energoblok; rayon energy unit]. The following facilities are located here "under one roof": a cold center for supplying air conditioning for the public buildings and a system for removing oxygen from water, since it leads to the active corrosion of pipes. Never before has a municipal economy system had such a complex service. The REB also contains transformer substations, a heating point, which usually stand in the courtyards of microrayons and take up very valuable space.

One can reach the REB from the side of the semi-underground engineering-operations transport throughway -- another unique installation at Chertanov Severnyy. The throughway is approximately 1 kilometer in length and more than 10 meters wide -- it serves as a type of border between the upper terrace on which the housing complexes are located and the lower one consisting of public buildings (a drop in relief of 28 meters).

On the one side of the underground street there is a concrete bulkhead 4 meters in height, which at times is interrupted by the narrow entrances to the garages, on the side of the tunnel buildings. On the other side of the street it adjoins the basements of the trade center and the workshops and administrative and operations unit of the sports complex.

Since the throughway is the shortest route between Chertanovskaya Street and the planned back-up road for Warsaw Highway, the decision has been made to use it for municipal transport purposes. Towards this end, the plans call

for two parking areas to be located along the route, with exits onto a walking path leading to the public buildings.

The thoroughway is both a transport and a distribution artery. It is used by motor vehicles for reaching all (with the exception of the entrance to the trade center) of the public buildings. Thus, deliveries of products, goods and materials and the exporting of packaged goods are carried out only underground.

The semi-underground thoroughway is combined with an engineering collector through which pass hot and cold water pipes, electric cable and a pipeline for the vacuum removal of trash. The collector is of such a type that the service personnel are able to inspect and repair the network at any time. The construction at Chertanov Severnyy of straight through and semi-straight through communications tunnels has made it possible to reduce sharply the length of the routes: no longer is there a need for laying them out throughout the territory of a rayon, around above-ground installations.

In discussing the collector, we mentioned the pipeline for the vacuum removal of trash contained in it. It gathers up all types of residues, including food waste products, from 130 barrels located in the buildings. This eliminates the need for establishing sanitary zones in the courtyards for trash containers and also all of the laborious manual work associated with the removal of trash.

This year the experience of Chertanov Severnyy in underground construction will be presented during the "Foundation Construction Exhibit" of the Construction Section at the USSR VDNKh [Exhibition of Achievements of the National Economy of the USSR].

According to data supplied by NIPI [Scientific Research and Planning Institute] for the general plan for Moscow, a tendency has been observed towards making maximum use of underground space for accommodating the engineering communications of microrayons and blocks and also for garages.

In particular, MNIITEP is developing plans for placing motor vehicle parking areas in the foundations of series P-44/16 and P-30/12 buildings and for developing documentation for underground central heating points and transformer substations. Today there are already several tens of such underground installations in the capital -- in the Volkhonka region and the ZIL [Moscow Automobile Plant imeni I.A. Likhachev], they are located along Chernomorskiy and Simferopol'skiy boulevards and Bolotnikovskaya and Artemovskaya streets.

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CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

OREL CONTINUOUS PLANNING SYSTEM DISCUSSED

Moscow NA STROYKAKH ROSSII in Russian No 5, May 79 pp 6-9

[Article by S. Zhurba, head of the Technical Production Division of the Bureau of Introduction of TsNIIOMTP, I. Rozina, head of the sector, and M. Pishchikov, lecturer in the Department of Construction Finance of the MISI imeni V. Kuybyshev, candidate of technical sciences: "Improving the Orel Continuous Planning System"]

[Text] The system of continuous planning and flowline construction introduced experimentally at Orel is being increasingly widely disseminated in various cities in our nation. It is now the basis for carrying out comprehensive building development of mass housing construction rayons.

Just how is the Orel continuous planning system being introduced, and what sort of difficulties are there in executing it?

The Bureau of Introduction of the Central Scientific Research Institute for Organization, Mechanization and Technical Aids in Construction of USSR Gosstroy and the Scientific Research Institute of Operations Control Systems at the Moscow Construction Engineering Institute imeni V. V. Kuybyshev have accumulated definite experience for several years in the introduction of this method. For example, direct economic agreements were concluded with the administrations of capital construction of the gorispolkoms of Cheboksar, Ryazan', Yaroslavl', Izhevsk, Kirov, Aleksandrov and a number of others, on giving methodological and practical assistance in carrying out the system of continuous planning and flowline construction.

Left behind long ago was the first stage of introduction--familiarizing the construction workers with the basic principles of Orel continuous planning and explaining and correlating them with local conditions.

In all the cities in which the new system is being put into operation, the decisions of the gorispolkoms to convert to continuous planning have been made, services necessary for this, such as a coordinational center, a work group for the capital construction administration and an operations-control center have been established and directive schedules for flowline construction are being drawn up. Everyone unanimously acknowledges the tremendous

potentials of this method, but so far the results from putting it into operation are not very significant.

The principles incorporated in the system are of the sort that should ensure completeness in building up housing rayons, but an analysis of the construction of the microrayons of many of the cities that have converted to the new method showed that the construction of schools and kindergartens is lagging behind the construction of apartment houses by an average of 1-2 years, and of trade and cultural-everyday facilities--by 3-4 years. This leads to an increase of up to 4-5 years, and sometimes 6-7 years, as against the planned 2-4 years, in the length of time taken to build up the microrayons. The lack of completeness and insufficient concentration of resources in the building development reduce the efficiency of using the capital investments and lower the technical-economic indicators of the construction organizations.

Irregularities and lack of orderliness in planning and financing the residential housing construction, lack of technical documentation and also lack of a single builder hinder the implementation of complete building development of the cities.

When there is a large number of buyers (which, unfortunately, occurs where a single buyer is established only nominally), the territory of the cities is divided into areas that are not integrally connected with each other, and the shortage of funds allotted by the buyers for the construction of facilities for social and cultural-everyday purposes complicates the complete building development. All this makes it impossible to use the city territory efficiently and results in the cities being developed uniformly, without any prospects for a comprehensive solution to social problems.

The large number of buyers causes great difficulties when resources are concentrated for planning and constructing the engineering systems, boiler houses, transformer substations, stores and other facilities outside the actual section. Because of the fact that with many buyers the cost agreed upon for the planning and surveying work exceeds the existing limits, the length of time for planning the facilities often exceeds the normative periods, which results in the obsolescence of the plans.

At present the solution to the problems of developing cities is mainly within the jurisdiction of many ministries and departments, which not only finance the construction of the industrial enterprises, but also serve as the buyers and construction workers for the residential buildings, preschool institutions and municipal and cultural-everyday facilities. This leads to the ministries and departments being engaged in functions that are not characteristic for them--determining the ways to develop the municipal services. Under these conditions, it is impossible for the gorispolkoms to coordinate the general problems and tasks of urban development with the local interests of the numerous builders.

Practical experience in implementing the system of comprehensive continuous planning in most of the cities has confirmed the need for maximum possible unification of capital investments in residential housing construction and for elimination of the disproportions in allocations in various directions of this construction and of the lack of coordination caused by allotting resources according to the procedure of share participation.

Reinforcing the role of the single buyer, however, means primarily changing the entire structure of the administrations of capital construction of the gorispolkoms, which, under the conditions of the system's functioning, are entrusted with the following tasks:

Centralization of capital investments and distribution of material-technical resources needed to erect the facilities;

Fulfillment of measures to prepare the territories to be developed for building and other functions connected with preparing for construction;

Participation in conjunction with other organizations--executors in drafting industrial planning documents necessary for the vital work of the system;

Supervision of the course of the planning organizations' drafting of the planning estimates;

Filling the orders for supplies of industrial and nonstandard equipment;

Gathering and processing periodic information received from the executors responsible;

Compiling and turning over to the coordination center information on the course of the work and proposals directed toward its improvement;

Correcting the two-year directive schedule.

It should be noted that the wage rates for the associates of the administrations of capital construction, which are low as compared with the wages of the workers in the construction and planning organizations, despite the considerable increase in work volumes, as well as the small size of the staffs, make it impossible to staff these administrations completely with a sufficient number of skilled specialists, and are the main hindrance to establishing and strengthening the system of the single buyer.

In addition, the administrations of capital construction of the gorispolkoms, in the overwhelming majority of cases, have no higher organization either in the oblast or in the republic. Operations management by the gorispolkoms does not ensure the solution of many technical and organizational problems.

The problem of moral and material stimulation of the workers at the administrations of capital construction has not been adequately solved. The existing procedure of awarding bonuses in the amount of 2.5 percent of the total sum for the planned introduction into operation does not give them an incentive to create the conditions for turning housing over for operation ahead of schedule. Moral incentive for the workers in the capital construction administrations is practically nonexistent.

In the last few years some attempts have been made to improve the structure of the service of a single buyer. In the Georgian SSR, for example, a Main Administration for Capital Construction at the Council of Ministers of the republic was organized as a single buyer for residential housing construction. It has under its jurisdiction the administrations of capital construction of the Councils of Ministers of the Abkhazian and Adzharian ASSR's, the Yugo-Osetinskaya Autonomous Oblast, the interrayon administrations of capital construction of Tbilisi, Samtredia and Gori, and also the administrations of capital construction for residential housing facilities in Kutaisi and Rustavi.

The wage rates of the workers of the Main Administration of Capital Construction and the administrations of capital construction locally are equated to the staff wage rates of the construction ministries and their organizations.

In accordance with an approved regulation, the Main Administration for Capital Construction is the republic organ, and in its work is under the jurisdiction of the Council of Ministers of the Georgian SSR.

In Donetskaya Oblast of the Ukrainian SSR an Oblast Administration of Capital Construction was established at the oblispolkom, which has under its jurisdiction 20 administrations of capital construction and capital construction departments of the gorispolkoms, which perform the functions of a single buyer in the oblast for residential housing construction when the volume of capital investments is up to 200 million rubles. Similar structural improvements have been carried out in the Belorussian SSR.

The Main Administration of Capital Construction of the Moscow and Leningrad gorispolkoms have been entrusted with the functions of a single buyer in building up Moscow and Leningrad.

These measures, however, carried out in individual republics and cities, cannot fully solve the problems on a nationwide scale. Therefore, one of the priority tasks in improving construction in the city is to draw up a unified regulation on administrations of capital construction, which should determine their structure, depending on the volume of capital investments, and the wage rates adjusted to the level of the organizations taking part in building up the city.

There must be support of the proposal of many cities with respect to converting the work of the main administrations of capital construction and the administrations of capital construction to economic accountability, thereby entrusting them with full responsibility for establishing finished output, using all forms of material incentive, on a par with the contracting construction organizations.

One of the reasons for the hindrance in introducing continuous planning and preventing complete building up of the city in accordance with the plan is the existing procedure for planning resources for the construction of schools, kindergartens and nurseries, polyclinics, municipal and other facilities of microrayon importance, in which the capital investments for their construction are distributed by organizations.

It would be expedient to direct the resources for residential and municipal construction from a single source, after granting the gorispolkoms the right to internal redistribution of the capital investments, in order to ensure constructing and putting the housing into operation at the same time as the facilities for social, cultural, every-day and municipal purposes. This will increase the role of the administrations for capital construction as a planning organ and will contribute to more rapid solving of urban development problems.

In order to accelerate introduction and improvement of the system of continuous planning and flowline construction on the basis of the special features of carrying out capital construction in different cities in the nation, another series of pressing problems must also be solved. The first of them pertains to the material-technical provision and complete supply of equipment, included in the duties of the buyer. At the administrations of capital construction this work is based on the decree of the USSR Council of Ministers of 28 September 1970, No 810, which specifies, in the role of the buyer, the ministry or department, and not the administration of capital construction of the gorispolkom, which has undoubtedly fewer potentials, particularly in providing nonstandard equipment. There has been no solution to the problem of revising the sanitary-engineering, electrical engineering and other equipment under the conditions of a single buyer--the administration of capital construction of the gorispolkom. There are no directives either in regard to warehouse facilities for equipment and resources for their construction. The staff of warehouse workers and transport workers, including the truck drivers, has not been legalized, nor has putting truck transport and materials handling mechanisms at the disposal of the equipping division of the administration of capital construction of the gorispolkom.

With the transition to continuous planning, the interrelations of the organs of the system for supply of construction with the subdivisions of USSR Gosnab, the sectorial organizations of the materials and equipment supply department, the plants of the construction industry and the outside suppliers of material resources has remained virtually unchanged, just as

there have been no changes in the interrelations of the system of supply for the general construction organizations with the systems of supply for the subcontractors with respect to turning over funds.

When there is a truly single buyer, as is specified by the Orel continuous planning system, and when two-year plans are worked out in detail, for both capital construction and material-technical supply, it would become possible to draw up the schedules for providing specific facilities and attaching suppliers in consideration of the plan for the following year.

Therefore it is expedient to concentrate and centralize the system of material-technical provision with the establishment of unified organizations (union, republic, oblast, kray), concerned exclusively with providing for residential and municipal construction.

Accordingly, there must be advanced compilation of the plans for material-technical supply, since often attaching the funds for equipment is drawn out for the entire first quarter, and for a number of items the funds for carry-over construction projects are allotted only for priority facilities. As a result, the first quarter, for construction projects carried over, is not satisfactorily provided with equipment.

There are discrepancies in the normative documents--SN-401-69, "Provisional Instructions for Drafting Plans and Estimates for Residential Housing Construction" and "Regulations on Contracting Agreements"--with respect to the periods for obtaining the planning estimates from the planning institutes and the buyer's turning them over to the contractor: according to SN-401-69 it is turned over by the planning organization to the buyer in the period up to 1 September of the year preceding the construction, but the "Regulations on Contracting Agreements" require that the documents, already approved by the administration of capital construction, be turned over to the contractor by this deadline. In both cases there is no time left for the contractor and the buyer to issue comments for the planning estimates, corrections for the comments, and for agreement on it by the contractor and subcontractor and approval.

The following periods are necessary for verifying and correcting the planning estimates:

Twenty days for the contractor to verify it, 20 days--for examination in the division of expert examiners at the oblispolkom, 20 days for the planning institute to correct it and 20 days for verification after the corrections in the division of expert examiners and at the contractors. That is a total of 80 days, that is, in practice the planning estimates can be approved at best in December.

Because of this it would be expedient to discuss the problem of establishing the period for turning the planning estimates over to the buyer by the planning organizations at the end of the calendar year, that is, 1 January of the year preceding the start of construction.

In the construction of housing microrayons, tracts, blocks and other types of urban developments, the procedure now existing for planning, designing and financing the facilities for cultural-everyday purposes, included in different departments, results in construction in different phases, and does not contribute to the complete building up of the city. Therefore, in comprehensive building development, all the resources for the combined estimate must be turned over to a single buyer--the administration of capital construction of the gorispolkom--without singling out from them resources for construction of facilities for public health, culture, trade, etc.

The existing arrangement of strict limits on the planning restricts, and in most cases completely removes the possibilities for taking into account, in the process of planning and after its completion, efficient new structural designs and building materials. It would be expedient for the single buyer to have a consolidated limit for the planning work to use for the above purposes.

Early, advance engineering preparation of the territory is extremely important in organizing a smooth flow of construction. The roads within the blocks of buildings should be somewhat removed from the buildings, in order to provide the possibility of placing tower installation cranes there. The planning estimates should take into consideration the fulfillment of this work in individual stages.

Introducing the Orel continuous planning system should be begun first of all at large-panel house-building projects, financed by a single buyer, with organization of flowline production for all the work, beginning with the engineering preparation of the territory and advance drafting of the plans for the rayons of the future building development.

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CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

OLYMPIC STADIUM MODERNIZATION DISCUSSED

Moscow NA STROYKAKH ROSSII in Russian No 5, May 79 pp 52-55

[Article by A. Repetiy, chief architect of the plan: "The Modernization of the Dinamo Central Stadium"]

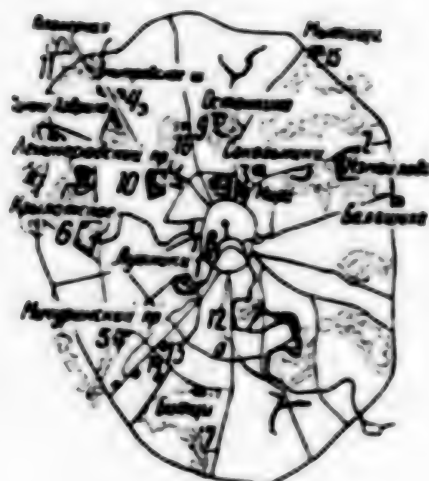
[Text] The country's oldest sports complex--the Dinamo Central Stadium on Leningrad Prospekt--will receive numerous participants and guests at the Moscow Olympic Games in the summer of 1980.

The preliminary soccer matches of one of the subgroups of the national Olympic teams, the field hockey finals and training in fencing, gymnastics, boxing, diving, water polo and other types of sports will be held here.

Established as far back as 1928, this first-comer in domestic sports construction has become a major center for physical education in the country, and its location, in one of the most picturesque corners of the capital--Petrovskiy Park--has made the stadium a favorite place for recreation for thousands of Moscow citizens.

Its first architects, A. Langman and L. Cherikover, specified in their plan a horseshoe-shape arrangement of grandstands for 25,000 spectators and a soccer field, bordered by the slag ellipse of the 400-meter running track and concrete ribbon of the motorcycle track. Even in 1934, however, it had become necessary to modernize the structure, and this was essentially its second birth. As the result of constructing the east grandstands and additional rows in the north, south and west stands, their total capacity increased to 50,000 persons. The spaces under the grandstands, where the sports arenas and other facilities were provided, were expanded.

In the process of further development of the complex, a new training and instructional nucleus was created--the Malyy Stadium--and covered structures appeared--skating rinks, gymnastic arenas, a soccer-track and field ring, tennis courts, and also swimming pools--indoor, with lanes 25 meters long, and outdoor, with a tank measuring 50 X 25 meters--and other facilities for athletic and service purposes.



Location of Olympic Facilities in the City's Structure (See Journal No 1 for 1977):

1--sports structures at Luzhniki: all-purpose arena (No 2, 1977), building for Olimpiada automated control system (No 8, 1978), renovation of existing complex (No 4, 1979); 2--Olympic facilities at Izmaylovo: all-purpose arena (No 3, 1977), hotel complex (No 6, 1978); 3--sports complex on Prospekt Mira (No 4, 1977); 4--all-purpose arena at Khimki-Khovrino (No 5, 1977); 5-- Olympic Village: master plan (No 6, 1977), sports center (No 7, 1977), service center (No 8, 1977), administrative center (No 9, 1977), cultural center (No 12, 1977); 6--sports complex at Krylatskoye: cycling track (No 1, 1978), cycling path and archery field (No 2, 1978); 7--equestrian sports base at Bittsy (No 3, 1978); 8--main press center (No 4, 1978); 9--Radio-television complex at Ostankino (No 5, 1978); 10--complex of structures on Leningrad Prospekt: soccer and track and field ring of the Central Army Sports Club (No 7, 1978); service-passenger building of the MVL (No 3, 1979); 11--Planernaya equestrian sports base (No 9, 1978); 12--international post office on the Warsaw Highway (No 10, 1978); 13--hotel for foreign athletic judges (No 11, 1978); 14--automatic long-distance telephone exchange building on Butlerova Street (No 12, 1978); 15--Dinamo shooting gallery at Mytishchi (No 1, 1979); 16--hotel on Dmitrovskiy Highway (No 2, 1979); 10--modernization of Dinamo Stadium.

The present plan for preparing the stadium for the coming Olympic Games contests specifies both modernization of the existing structures and the construction of new buildings, public services and amenities for the territory, systematization and improvement of the roads and putting in parking lots for motor vehicle transport. At the same time, the territory of the complex remains within the existing boundaries.

A considerable amount of work is to be done to update the Bol'shaya Sports Arena. The grandstands will be waterproofed by using self-stressed concrete, the seating for the spectators will be replaced and the facilities under

the grandstands in the northern section, designed for officials and guests of honor, will be redesigned. Located here will be the entrance halls and lobbies for the International Sports Federation and National Olympic Committee representatives; recreation rooms and a bar and buffet for members of the national sports delegations, referees and judges; a press-bar and press center with work rooms; well-appointed locker rooms for the athletes, etc.



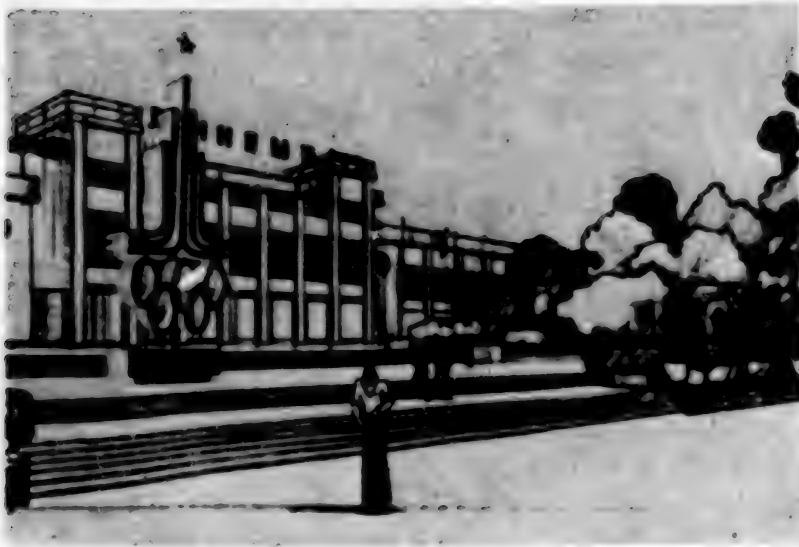
Master Plan for the Sports Complex at the Dinamo Stadium:

1--Bol'shaya Sports Arena; 2--Malaya Sports Arena; 3--covered soccer and track and field ring; 4--covered skating rink; 5--covered tennis court; 6--administrative building; 7--training field for field hockey; 8--indoor swimming pool.

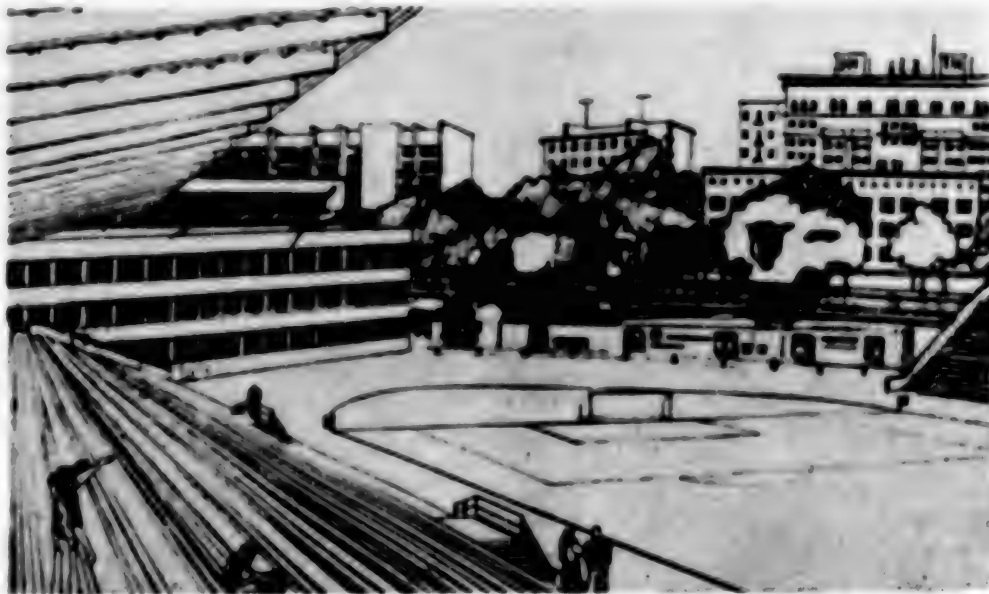
Areas are designed at the grandstands for installation of television-radio-movie equipment, and seats with desks for the press.

To illuminate the playing field, metal latticed towers 69 meters high with a unique shape are being installed, and on them are arranged projectors of the Ternopol Vatra Association, which ensure a lighting intensity of 1200-2000 lux for the field, and the possibility of making color television transmission at night.

The soccer field will have a natural lawn surface, and the running tracks, the number of which will be increased to eight--artificial, tartan surface.



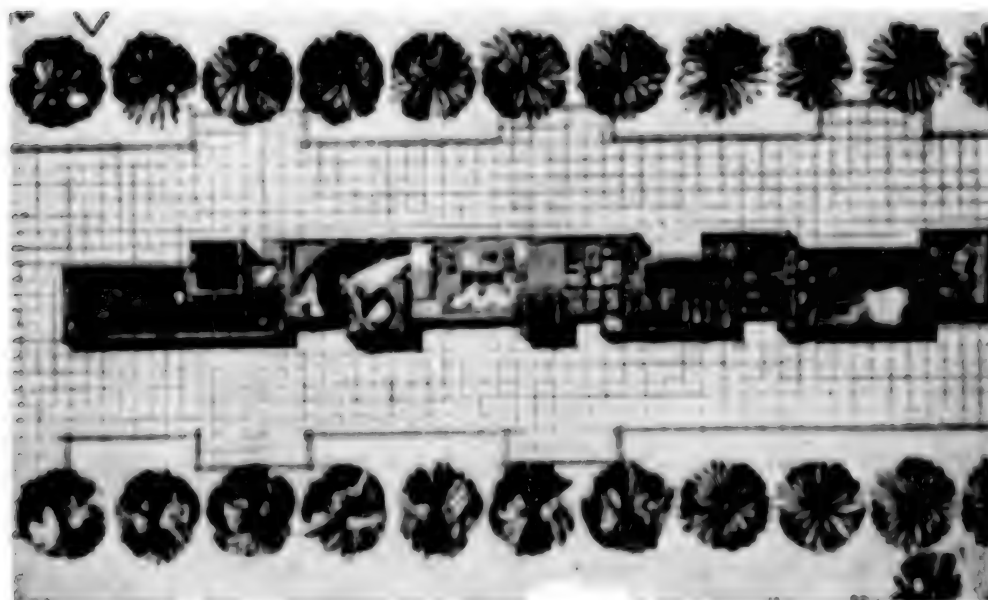
Entrance to the West Grandstands of the Bol'shaya Sports Arena. View From Leningrad Prospekt.



The Stadium's Malaya Sports Arena With Covered Grandstands (Perspective).



South Entrance to the Dinamo Stadium From the Entrance Hall of the Dinamo Subway Station (Perspective)



Ornamental Pool on the Main Avenue of Stadium After Modernization

The outdated wooden paneling on the facades will be replaced with aluminum, and the bas-reliefs on the frieses of the north and south grandstands are being restored. The traditional architectural aspect of the structure will not be changed, but it will appear to us updated, better ordered and festive.

The capacity of the Malaya Sports Arena will increase to 10,000 spectators after the construction of the east grandstands seating 5,000 is completed. Locker rooms for the athletes, with showers and toilets, offices for the trainers, masseurs and physicians, rooms for the judges, clerks and members of the judges' panel and also a snack bar for the athletes are provided in the new facilities under the grandstands. The grandstands will be made of precast reinforced concrete slabs with waterproofing made of self-stressed concrete. The supporting walls are brick. Artificial lawn surface is planned for the field, and for the running tracks--a sportan type. An information board is being installed in the south section of the arena.

The eight-story administrative-everyday service building is designed for the administrative and technical services of the Dinamo All-Union Order of Lenin Physical Culture-Athletic Society, as well as for its Central, Russian and Moscow city soviets. The northwest wing of the building will be occupied by a hotel for the athletes and service personnel of the society. Entrance halls, lobbies, a dining room seating 120 and a cafe seating 80 persons and a conference hall for 350 spectators are planned for the first floor. The building is designed in the form of a compact volume, a square in the plan, with an interior courtyard that plays the role of the distributing point among the various functional areas.

The supporting structures are made in a precast reinforced concrete frame from list KMS-101, with suspended claydite-concrete panels manufactured individually, which give the building a distinctive, memorable aspect.

During the period of the Olympic Games the work quarters of the International Field Hockey Federation, the press center, press bar, cafe and security services will be located here.

The modernization will also to a certain extent affect other sports structures at the stadium. A second story has been built on to the indoor tennis courts, with locker rooms for the athletes, showers, trainers' and physicians' offices, deck-structure floors with a layer of fiberglass fabric sound insulation have been installed, new glass panels are being put in, modern lighting has been provided, etc. In the indoor swimming pool the acoustic ceiling made of fabric has been replaced with an aluminum one, and new engineering and industrial equipment is being installed.

Taking the complicated nature of the planned structure for the stadium into consideration, the designers focused their main attention on public services and amenities and organization of more clear-cut zoning of the territory for the complex, bringing out the existing planning axes--the pedestrian avenues

and lanes. All the entrances to the stadium have been somewhat enlarged and designed in contemporary structures and forms. New fencing is being installed. New cashier pavilions have been neatly built in to the retaining wall in the area between the two entrances to the Dinamo subway. They are also being built at the main entrances to the stadium.

The existing longitudinal pedestrian avenue that passes across the entire territory of the Dinamo stadium from the northwest to the southeast is intersected by the newly designed latitudinal avenue, which connects the southern entrance with the eastern one, and along it are placed decorative fountains and pools, lamps, flower-sellers and benches for resting. Still another avenue connects the eastern entrance to the Malyy Stadium with the southern entrance near the building for the swimming pool. These main pedestrian routes contribute to a more clear-cut definition of the principal areas of the complex--the Bol'shaya Sports Arena with its entrances and grounds; the Malaya Sports Arena with the east and west grandstands, the covered soccer-track and field ring, the skating rink and gymnastic hall; the new administrative building in the complex with the field hockey training ground and swimming pools; the service area--between the Malaya Sports Arena and the swimming pool. A recreation area with athletic fields and playgrounds is specified for the south section.

The sketch for the artistic-monument design of the territory includes installing, on the approach to the stadium from Leningrad Prospekt, the Olympic emblem, and alongside it, on the grounds of the Dinamo territory--thematic display stands; at the entrances to the stadium--groups of flag-staffs with the flags of the participating countries; in front of the north grandstands--a sculptured composition using athletic themes; on the main promenade--a Board of Honor of the Dinamo athletes who have been Olympic Game winners.

A monument with a list of names in memory of the athletes of the Dinamo Society who were killed during the years of the Great October Revolution will be built.

An ornamental wall with a panel reflecting the theme of the Olympics is planned for the side of Petrovsko-Razumovskiy Avenue. A number of panels and compositions made from molded glass and forged metal will also decorate other pedestrian ways.

All this work will be done by a creative collective of artists--the monument workers of the RSFSR Moscow City Artists.

The plan for the modernization was drafted by the authorial collective of Workshop No 22 of the Mosproyekt-1 Administration, including architects A. Meyerson (director), M. Bylinkin, N. Volkov, A. Repetiy, A. Bazhakina, G. Klimenko, L. Yermakova and Bl Segal'; engineers L. Pil'den, A. Pyatetskiy, V. Annenkova, M. Pole, B. Erlikh and I. Matsneva, with the assistance of a number of other planning organizations in Moscow.

Master Contracting Construction and Installation Trust No 1 will perform the main work.

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CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

DELAYS IN COMPLETION OF OLYMPIC CONSTRUCTION SCORED

Moscow MOSKOVSKAYA PRAVDA in Russian 29 May 79 p 1

[Article by N. Chernyak, leader of brigade of plasterers attached to the 88th Administration of the Mosotdelstroy Trust No. 5; Yu. Ivanov, engineer for technical supervision of the construction board; D. Shevchenko and V. Katran': "Time Does Not Wait"]

[Text] During the recent plenum of the CPSU MCK [Moscow City Committee], which addressed itself to the subject "Tasks Concerned With Preparing For and Conducting the 1980 Olympic Games in Moscow," the tasks of the leaders and party organizations of olympic construction projects in the capital were clearly defined. It was noted during the plenum that the construction of individual olympic projects involves many shortcomings. One such project is the multi-purpose gymnasium in Izmaylovo.

One of the largest olympic projects in the capital, the Izmaylovo Sports Palace, is being erected on Sirenevyy Boulevard by the 165th Administration (general contractor) of Mosstroy Trust No. 2. This sports complex is unusual in terms of its architecture, its scale and the complicated nature of its construction. It includes a multi-purpose gymnasium for 5,000 spectators, training and limbering up halls and a large number of administrative-domestic and technical facilities. During the Olympic Games, competitions will be held here in heavy athletics. The multi-purpose gymnasium can be transformed into an ice rink measuring 30 X 60 meters.

The construction of this project is presently in its final stage. Finishing and specialized work is being carried out here along a broad front. The obligations are tense: a large volume of important work still remains to be carried out.

Although the builders coped with their task for 4 months, an analysis of the course of operations at the project reveals that the construction rates are unsatisfactory. The general contractor has twice corrected the plan for the

first quarter. It finally amounted to only 16 percent of the annual plan. Although they experienced difficulty, the builders nevertheless succeeded in coping with their reduced task. The decision was made during the second quarter to recover lost ground and thus the plan was almost doubled. As a result, fulfillment of the program was seriously threatened in April and it was not until the last days of the month that the builders, at the cost of a great amount of effort, succeeded in reaching their planned level. In May the situation once again became complicated.

What is preventing the work tempo from being accelerated?

"We finishing workers" responded the chief of a sector of the 88th Administration of Mosotdelstroy Trust No. 5, M. Belokhvostikov, "are being hindered by sluggishness on the part of the general contractor and by an absence of coordination of the work being carried out by our co-workers: sanitation engineers, electricians, air conditioning specialists.

According to the original schedule, the facilities for the technical basement, storerooms, boiler rooms, machine room for refrigeration units, heating point and electrical switchboard and air conditioning rooms should have been turned over for finishing work last autumn. Not one of these facilities had been turned over completely to the finishing specialists as late as April and some have still not been turned over. In some of the facilities, no preparations have been made for the floors and in others the electrical engineering or sanitary engineering work has not been completed nor the walls dried.

So as not to delay the equipment installers, the finishing workers often work in unprepared and damp rooms, plastering and covering the walls in a random manner. Such work is inefficient and unproductive. The outputs of many workers have dropped by almost 20 percent. The brigades of slab workers headed by V. Glushchenko, N. Panarina and O. Khryukin are also performing below their potential.

According to the secretary of the party bureau for the general contracting 165th Administration of the Mosstroy Trust No. 2, S. Gerasimov, a new schedule is presently being employed at the project for turning the facilities over for finishing work (it bears mentioning that this schedule has also already been broken and is being corrected). In order to ensure that this schedule is something more than just a piece of paper, the leaders of the construction project must organize efficient control over it and be very strict in their handling of those who violate planning discipline.

Many vexing discrepancies are surfacing here. A brigade headed by A. Turmasov of the 88th Administration of Mosotdalstroy Trust No. 5 was assigned the task of installing suspended aluminum ceilings for an area of 7,000 square meters. The installation workers enthusiastically undertook to complete this work. However, shortly thereafter it was discovered that the supply of available aluminum rods, the delivery of which was the

responsibility of the general contractor, was very miserly. In order to avoid standing idle, the brigade made preparations for the ceilings: it proceeded to suspend the rough metal. At this point the work came to a halt: the aluminum stock has still not been delivered.

"As a result, the schedule for installation work was disrupted" stated work superintendent V. Kovalev, "the brigade was forced to work at less than full capability. Subsequently, since the work is only partially completed, we will once again have to raise the scaffolding and this represents additional expenses and thousands of rubles worth of losses.

Nor is the work proceeding satisfactorily in other sectors of construction. The 68th Administration of the Mossantekhstroy Trust No. 3 should long ago have completed its work of installing covered water drains; the work was started very late. The 51st Administration of the Promventilyatsiya Trust has fallen behind considerably in carrying out its schedule. The planning for and laying of external communications are being carried out on a tardy basis by the 115th Administration of the Mosfundamentstroy Trust No. 4. The carrying out of finishing work on the front of the building has fallen behind noticeably.

The olympic construction work must be of the highest quality. However, the general contractor does not always exercise strict control over the work being carried out by all of the co-workers. For example, brigades of the 197th Administration of the Mosprommontazh Trust tolerated a number of discrepancies during the course of installing a portion of the stained glass. The defects were discovered only by the customer service. As a result, the installers were not paid for 20 percent of the work carried out in March. The lesson was in vain. The violations were repeated.

During the 1st quarter the general contractor vowed to present a front of work for all of the sub-contractors. But his words were not reinforced by actions. We still do not have complete coordination between all those participating in the construction work. The use of an overall approach in the carrying out of production work continues to be ignored and construction is being carried out mainly in one shift and with insufficient forces. For all practical purposes, there are no competitions being held among the collectives.

A considerable amount of time still remains before the end of the year. This does not mean however that the leaders of Mosstroy Trust No. 2 and its 165th Administration should continue to tolerate the serious shortcomings noted at the construction project.

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NEW KS-6471 HYDRAULIC SELF-PROPELLED BOOM CRANE DESCRIBED

Moscow STROITEL'NYE I DOROZHNIYE MASHINY in Russian No 4, 1979 pp 3-5

[Article by candidates of technical sciences I.F. Pakhomov, G.D. Fedorov, engineer V.F. Grosu (Zavod imeni Yanvar'skogo Vosstaniya Association) and Candidate of Technical Sciences O.A. Smirnov (VNIISTROYDORMASH Association): "Hydraulic Self-Propelled KS-6471 Boom Crane"]

[Text] The series production of the hydraulic KS-6471 crane, which has a telescopic boom with a lifting capability of 40 tons installed on a motor vehicle type chassis (see picture on cover), has been mastered at the Odessa Order of the Red Banner for Labor Plant for heavy crane construction imeni Yanvar'skogo Vosstaniya, based upon a plan developed at VNIISTROYDORMASH [All-Union Scientific Research Institute of Construction and Road Machinery] and the GSKB [state special design office] for heavy crane construction and jointly with the Polish Bumag Association. It will be employed for carrying out loading and unloading, construction and installation work at facilities located in regions having a moderate climate and temperatures ranging from -40 to +40° Centigrade. The KS-6471 crane can be used for creating different modifications possessing a high degree of standardization with the base model, for example, variants of the crane for use in northern and tropical regions.

The crane can operate on extension supports or without them and it can move along a hard surface area carrying freight from the hook of a boom that is 11 meters in length and oriented along the crane's axis.

Technical Characteristics of the KS-6471 Boom Crane

Maximum lifting capability, tons:	
on extension supports.....	40
without extension supports.....	10
Maximum cargo moved by the telescope, tons.....	12
Least radius of operation for the hook from the axis of rotation, meters.....	3.2
Greatest height to which hook can be raised, meters:	
for the basic boom.....	10.5

for the long boom.....	26.7
for the long boom with an ogee.....	34.4
for a tower-boom unit.....	46
Length of telescopic boom, meters:	
least.....	11
greatest.....	27
Length of uncontrolled ogee, meters.....	8.5
Length of controlled ogee, meters:	
least.....	8.5
greatest.....	20
Greatest frequency of rotation of turning platform, c^{-1} (revs/min).....	0.025(1.3)
Greatest speed in a change in the radius of operation of the hook, meters/min.....	6
Greatest speed in movement of sections of the boom, meters per minute.....	12
Chassis wheel formula.....	8X6
Greatest speed of movement, kilometers per hour.	
over a road.....	50
over terrain.....	30
Maximum angle of inclination of crane, degrees.....	15
Engine power rating, horsepower.....	176.6(240)
Dimensions when in transport status, meters:	
length.....	13.65
width.....	2.75
height.....	3.8
Weight of crane with basic boom, tons.....	44

The telescopic boom with its rigid suspension has two moving and one immobile sections. The movement of the mobile sections is carried out synchronously by means of two long-stroke hydraulic cylinders of two-way action (3) (see Diagram) and (4), with movement of the piston being up to 6 meters. The moving sections of the boom rest on sliding supports (slides). In order to increase the scope of the boom and the height to which the hook can be raised, an uncontrolled ogee is installed at an angle of 15° to the longitudinal axis of the boom.

The turret-boom unit consists of a tower which employs the telescopic boom of a crane that is 15, 20 or 27 meters in length and installed at an angle of 4° to the vertical. The raising and lowering of the controlled ogee is carried out by means of an auxiliary winch and a rope crane pulley. Use of the tower-boom unit makes it possible to install the crane in the immediate vicinity of an installation under construction and to expand the nomenclature of the construction operations.

The turning platform is fastened to the framework with the aid of a single-row roller support-slewing circle having internal engagement.

The principal cargo winch is used for moving cargo in the vertical plane, using the main hook for work carried out with the telescopic boom and the

auxiliary hook for work involving use of the tower-boom unit. It consists of an axial-piston hydraulic motor (13), a cylindrical reduction gear installed in the drum (14) and a normally closed disk brake (17) having a hydraulic circuit breaker and a pressure roller (16).

The rope is wound on the drum in four layers. The drum has ring rifling. All of the bearings and the gear wheels are lubricated by means of an oil that is poured into the drum. Control over the oil level is carried out with the aid of a level plug.

The auxiliary cargo winch (15) is used for moving cargo in the vertical plane with the aid of the auxiliary hook and also for raising (lowering) the controlled ogee during operation with the tower-boom unit. The design of the auxiliary cargo winch is similar to that for the principal cargo winch and differs only in terms of drum length.

The turning mechanism consists of an axial-piston hydraulic motor (9), a four-stage cylindrical reduction gear (12) and a constantly closed disk brake (10) with a hydraulic circuit breaker. A gear wheel (11) is installed on the vertical shaft of the reduction gear, where it engages the tooth rim of the support-slewing circle. The upper gear wheels are lubricated using the spraying method. Lubricant grease is applied to the upper bearings through the lubrication fittings.

The boom-raising mechanism is used for moving the boom in the vertical plane from -2 to 86° relative to the horizon. It consists of two hydraulic cylinders (7) and (8), both having two-way action. The holding of the hydraulic cylinder plungers in the desired position is carried out by means of hydraulic locks installed directly on the hydraulic cylinders.

The RS-401 motor vehicle type chassis supplied by the Bumag Association (Polish People's Republic) are produced in conformity with the transport requirements and so as to ensure movement over both roads and terrain. The framework of the chassis appears as a welded structure consisting of two longitudinal beams of box section, connected by forward and rear beams and also by rigidity diaphragms. The extension support beams are fastened to the framework.

The chassis includes a motor (2), clutch (5), gear box (6), universal joint, distribution box (21), two forward (1) and two rear (18) and (19) bridges and also a reduction gear (20) for the pump drive.

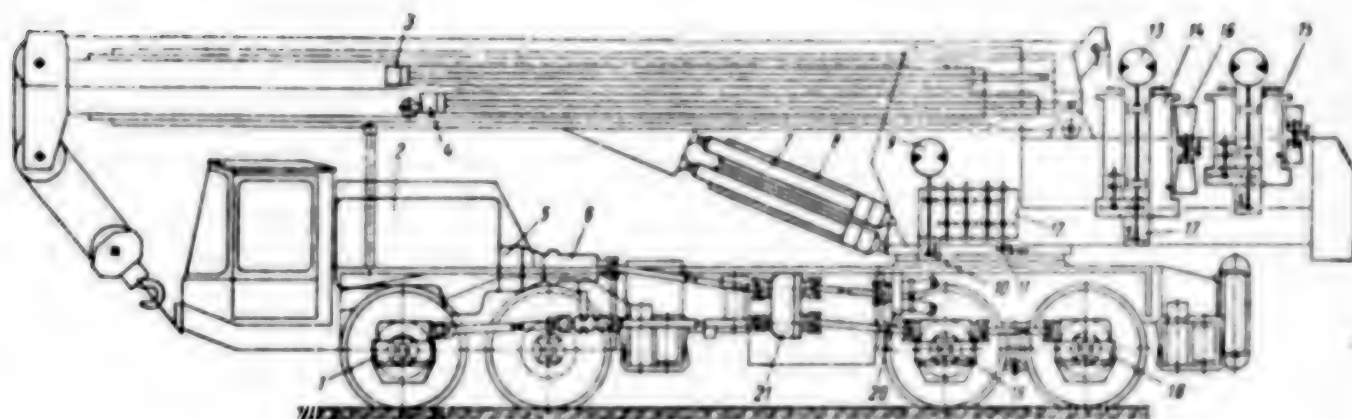
A motor with water cooling is installed on shock absorbers. The clutch is a single-disk type with dry friction.

The gear box makes it possible to obtain six forward speeds and one reverse speed. The gear box has an outlet for the pump drive of the extension supports. It is equipped with a synchronizer for shifting speeds (with the exception of reverse speed). The gear box is controlled mechanically.

The distribution box makes it possible to obtain two additional speeds. The distribution box has a unit for disengaging the front axle from the engine and also an outlet for the pump drive of the hydraulic drive for the mechanisms on the rotating part.

Four axial-piston pumps -- one Model 210.16 and three Model 210.25 -- are installed on the reduction gear of the pump drive.

The two leading axles are connected to the chassis framework with the aid of semi-elliptical leaf springs and a lever system which, during movement over terrain, equalizes the axle workload and raises the resilience of the suspension. The rear axles are connected to the chassis framework by means of a balance beam. Control over turning of the wheels is carried out with the aid of a hydraulic booster. A duplicate mechanical control system is also called for. The pump of the hydraulic booster is operated directly from the engine through a gimbal drive.



Kinematic Diagram of the KS-6471 Hydraulic Self-Propelled Boom Crane

The chassis are equipped with three pneumatic braking systems for braking during movement and when stopped and also for braking a trailer. Braking during prolonged descents is carried out using a brake unit installed on the engine's exhaust pipe in front of the muffler.

The electrical system of the crane was developed for a voltage of 24 volts and it includes the electrical equipment of the chassis and the crane unit. The electrical system is used for controlling the starting up of the chassis engine from the operator's cabin, for controlling the electromagnetic valves and for switching on and off the crane's illumination equipment and other instruments.

The hydraulic drive of the crane has closed circulation and combined speed control by means of liquid throttling, a change in the frequency of rotation of the pump shaft (chassis engine) and the connecting up of the second pump to the hydraulic motor of the cargo winches.

The crane's hydraulic drive includes axial-piston pumps and hydraulic motors 210.16 and 210.25, single-unit distributors with servocontrol, U4610.33A brake valves and other standard hydraulic elements.

The operator's cabin is mounted on the turning platform; inside it is lined with decorative plastic. The rear and upper windows of the cabin open to the outside. The cabin is equipped with an electric windshield wiper, ceiling light, fan, shatterproof glass and a medicine chest. During the winter the cabin is heated and the front windshield defrosted.

The crane is equipped with instruments and units for ensuring its safe operation.

The height limiters for the hook suspensions are automatically disengaged by the winches (main and auxiliary) when a hook suspension approaches the leading portion of the boom or ogee. The winches can be turned on only on the side where the cargo is being lowered. The limiters are installed on the leading portion of the boom and the ogee. They consist of a terminal switch which is actuated by a lever with a suspended weight. When the hook suspension moves the weight upwards, the lever, as a result of the action of the spring, presses against the terminal switch thereby terminating the movement of the hook suspension.

The depth limiters for the lowering of the hook suspensions are automatically disengaged when a maximum number of turns of the rope on the drum is reached. The limiter consists of a roller which actuates the terminal switch through a system of levers. When 2-2.5 turns of rope remain on the drum, the roller touches the drum, the lever presses against the terminal switch and movement of the winch ceases.

The limiter for the angle of inclination of the ogee automatically disengages the auxiliary winch when the ogee approaches the extreme lower or upper position. The greatest and smallest angles of inclination of the ogee relative to the horizon are limited by a unit of terminal switches installed on the leading portion of the boom.

A limiter for the angle to which the boom is raised automatically disengages the boom raising mechanism when the boom approaches its extreme upper position. The greatest angle of inclination of the boom relative to the horizon is limited by a terminal switch unit.

In terms of its technical data, the new KS-6471 hydraulic crane conforms to the modern technical level. Test results have confirmed the correctness of the design solutions selected during the creation of the crane.

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ELECTRONICS AND PRECISION EQUIPMENT

ARTICLES ON STEREO AND QUADRAPHONIC RECEIVERS

Moscow NOVYYE TOVARY in Russian No 5, May 79 pp 16-17

[Text] The Vega-115 Stereo Music Center

The "Vega-115 Stereo" Music Center is intended for the reception of monophonic and stereophonic radio broadcast programs using frequency modulation in the VHF band; for the playback of monophonic and stereophonic phonograph records in all standard formats (turntable speeds of 33 and 45 r.p.m.); as well as for the magnetic tape recording and playback of monophonic and stereophonic music and speech programs both from the internal radio receiver or record player, and from external audio sources (a microphone, tape recorder, tuner, etc.). The playback of the received radio station programs, musical phonograph records and magnetic recordings is accomplished through speaker systems or stereo headsets.

The music center receiver is a VHF tuner with a through stereo channel, four fixed frequency settings, automatic frequency control, a precise tuning indicator for the received radio station, a squelch system and a stereo signal reception indicator.

The following are used the music center: a stereophonic record player, in which the power amplifier is common to the receiver, record player and tape recorder; the output transistors are current protected against overload, and the protection actuates when the load is short-circuited or speaker systems with an impedance of less than 3.2 ohms are connected, as well as in the case where the amplifier is overloaded by a large signal. The music center has the following: controls for stereo balance, and loudness with tonal compensation, as well as tone controls for the high and low frequencies; a sophisticated operational switching system, because of which the operation of the radio complex is easy and convenient. Jacks are positioned on the front panel for the connection of the MD-201 stereophonic microphone, stereo headphones and a tape recorder for record and playback.

A type G-602 with a magnetic pickup cartridge and a MF-100 diamond needle (produced by the Polish Peoples Republic) as well as a stereophonic tape recorder panel with a tape transport mechanism produced by Hungarian Peoples Republic were used in the combination record player and stereo receiver.

The turntable (EPU) has the following: a microlift mechanism which raises the tone arm at the end of a record when the EPU cuts off; a manual microlift unit which makes it possible to raise and lower the tone arm at any point on a record without cutting off the EPU; a photoelectric cutoff switch (autostop device) which provides for cutting off the EPU when a record is concluded; a precise frequency control unit for the turntable rotational speed as well as speed monitoring by means of a stroboscopic unit; a skate force compensator (antiskate); static balancing of the audiopickup with respect to the horizontal axis; and a device for adjusting the contact force of the audio pickup within a range of from 0 to 40 mN.

The tape recorder has keyboard control of the tape transport mechanism, meters for the record levels in each channel, record level controls, a "pause" button for short term stopping of the tape transport mechanism, as well as a push button for engaging the noise suppression. The tape recorder is designed for operation with type MK-60 cassettes. The speaker system of the music center consists of two identical 15AS-4 closed sound columns. The total electrical impedance of a sound column is 4 ohms. The basic technical characteristics of the music center: powered from the AC mains at 110, 127, 220 and 240 volts at a frequency of 50 Hz; nominal sound pressure is 0.8 Pa; the nominal output power is 2×10 watts; the range of reproduced frequencies is 63 - 18,000 Hz; the weight of the music center unit is 20 kg, and that of a sound column is 8 kg.

The "Vega-115 Stereo" music center is produced by the Berdsk Radio Plant.

The "Elektronika D1-014-Kvadro" Highest Class Quadraphonic Audio Amplifier.

The "Elektronika D1-014-Kvadro" highest class quadraphonic audio amplifier is intended for complementing component home entertainment electronic systems. It can be used to amplify monophonic, stereophonic and discrete quadraphonic signals, as well as decode the quadraphonic signals of the "QS" and "SQ" matrix system and convert a stereophonic signal to a pseudoquadraphonic one. The "Elektronika D1-014-Kvadro" has additional functional capabilities as compared to the "Yupiter-Kvadro" amplifier: a logic gain control circuit for "QS" system operation; three-band tone controls; protection of the speaker systems against overloads; a built-in quadraphonic decoder, etc.

The basic technical characteristics are: nominal sinusoidal output power into a 4 ohm load is 25 watts $\times 4$; the nominal sinusoidal output power in the "doubling" mode into an 8 ohm is 50 watts $\times 2$; the music power rating into a 4 ohm load is 35 watts $\times 4$; the nonuniformity of the frequency response in a nominal frequency range of 20 - 31,500 Hz is no more than ± 1.5 dB; the power bandwidth is 20 - 20,000 Hz; the harmonic distortion factor is no more than 0.5%; the signal to background noise and signal to noise ratios are no less than 60 dB (from the "phono" input) and 70 dB (from the "Aux. input"); the crosstalk attenuation between the channels in the stereo mode at 1,000 Hz is

40 dB; the power consumption is no more than 260 watts; the weight of the amplifier is no more than 20 kg; it is powered from the AC mains at 127 and 220 volts, a frequency of 50 Hz; the overall dimensions are no more than 505 x 151 x 420 mm; the weight is 20 kg. The price is 700 rubles.

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CSO: 1821

ELECTRONICS AND PRECISION EQUIPMENT

BRIEFS

KADR-ZPM VIDEO TAPE RECORDER—Novosibirsk—Video Tape Recorders for the 1980 Olympics. The "Kadr-ZPM" video tape recorders, intended for the olympics television and radio complex, have been sent from Novosibirsk to Moscow. The "Kadr-ZPM's" are third generation video tape recorders of this family. They were designed and manufactured at the Novosibirsk Plant for Precision Machine Construction. Many of the greatest historical events have been recorded on color tape with Novosibirsk video tape recorders. Thanks to them, the residents of several nations of the world were able to view the sessions of the 24th and 25th Congress of the CPSU, and the joint Soviet - American space flight in the "Soyuz" - "Apollo" program. All of the Central Television Network Programs are now handled by 70 Novosibirsk video tape recorders. The precision machine construction plant is to fabricate 104 of the new generation video tape recorders for the Moscow olympics. Some 28 "Kadr-ZPM" units will be installed prior to the start of the Sports Day of the Peoples of the USSR on the Central Television Network. The "Kadr-ZPM" differs significantly from its predecessors: the broadest use of microelectronic circuits have found applications in this video tape recorder, something which improves the color picture and audio transmission quality. The new video tape recorder provides for no less than three copies of any recording. Using a special code, one can edit a recording, and after this, make new copies directly from the edited recordings for transmission via communications channels. The Novosibirsk video tape recorders will allow millions of television viewers of planet to view the sporting events of the 1980 Olympics. [Text] [Moscow TRUD in Russian 20 May 79 p 1] 8225

CSO: 1821

METAL ECONOMIZING INCENTIVES NOT WORKING

Moscow TRUD in Russian No 131, 8 Jun 79 p 2

[Article by Yu. Konovalov and L. Gorskiy, candidates in technical sciences and specialists at the Donetsk Scientific Research Institute of Ferrous Metallurgy: "Why are the Stimuli Not Working"]

[Text] The country's economy can obtain an enormous amount of additional metal with the same quantity of raw materials and equipment and without building new shops and plants. This is the kind of gain that is provided by rolled goods at minus tolerances. What is that? In rolling metal the standards permit certain deviations in width and thickness from the established sizes. If machine tools were to operate in such a way that every product had the smallest permissible sizes, it would be possible to obtain a considerable amount of sheet goods, angle iron, and channel iron from every ton of steel.... Moreover, their reliability and durability would be guaranteed by the standards and would completely satisfy the needs of clients.

The advantages are obvious. However, despite the fact that quite a few decisions have been made concerning the introduction of minus rolling, it is not taking root well.

Seven years ago the USSR State Committee for Science and Engineering commissioned our institute to study and introduce minus rolling for the country's sheet rolling mills. We gave especial attention to the experience of the Magnitogorsk Metallurgical Combine where the mass production of steel sheet in the field of minus tolerances was mastered for the first time.

Today, thanks to the dissemination of the experience of the Urals workers, the country is receiving around 200,000 additional tons of sheet steel a year. An impressive figure. Nevertheless, it is much smaller than the branch's real possibilities.

Minus rolling cannot be introduced by directive, or by order. It is because modern equipment cannot ensure ideal precision that the state standards

permit deviations from the established sizes. Only a very high level of expertise on the part of workers makes it possible to accomplish minus rolling. But it is precisely the workers who are proving to be least interested in its introduction.

The most difficult question here perhaps is an improvement of planning and material stimulation. It is, first of all, the system of material stimulation for an economy of metal and for the production of additional output from the "surplus" that is imperfect. It is intricate and confused and depends upon the fulfillment of the plan for many indicators.

Let us cite a concrete example. The ministry "sends down" to an enterprise a plan for economizing metal on the basis of rolling in the field of minus tolerances. Let us assume that this plan is for 500 tons. If the plan is fulfilled at the plant bonuses are received. But, what if 490 tons have been economized? That is also a great success. But in this case there are no incentives. Why? After all, those 490 tons are the result of skillful work, of the mastery of fine craftsmen. The state has obtained a great gain. So to speak, from "nothing"--490 tons of metal. Why not reward the workers?

There is also another problem. The point is that the reserves here are not unlimited. But for the following year the ministry, as if it did not know this, plans "from the base," from what has been achieved, an additional increase of 1 to 1.5 percent of economized metal on the basis of rolling "at minus." Where is the economy to be gotten from? In the previous year 490 tons were economized with difficulty, the steel rolling worker thinks, and they left us without bonuses, and for this year they are planning 540 tons. Is it worth making the effort?

We have cited only one example of an imperfect system of stimulation. But another paradoxical situation is also possible. Let us suppose that the collective of a sheet rolling mill has worked excellently from the 1st through the 29th of the month. It produced rolled goods only "at minuses" and thanks to this was able to meet the orders of all consumers in advance. But on the 30th an unforeseen break in the rhythm occurred. It was either that suppliers had let the collective down, or that an accident had occurred. In a word, on the final day the mill was idle and the collective did not fulfill its plan for hot rolling. It is important to emphasize here that the collective fulfilled the plan for the sale of finished output on the basis of minus rolling. And the hot rolling indicator is only an intermediate one--it is from these rolled goods that the finished output is obtained. And although, we repeat, the plan was fulfilled, none of the workers will receive a kopeck in bonuses, including for the output which was produced from the economized metal.

I would like to especially emphasize that I am not speaking only about the economic side of the matter. The consequences of imperfect economic decisions show up in educational work (in words we call upon the workers to

economize metal, but in fact we create all kinds of obstacles) on peoples' wages, their moods, and, finally, on the moral climate of a collective.... It was noted in the CC CPSU decree "On a Further Improvement of Ideological and Political-Education Work": "The effectiveness of educational work is greatly lowered in those places where there arises a gap between words and deeds and where the unity of organizational, economic, and ideological work is not ensured." Economic executives are obliged to see and take account of all of the consequences of the decisions they take, to boldly admit their errors and correct them, and to make use of the experience of advanced collectives. The example of the introduction of minus rolling once again confirms this. Practice is suggesting various solutions for this economic problem, but for some reason matters are not moving off dead center.

A bonus system for an economy of metal which did not depend upon other indicators was used experimentally at a "1700" mill of the Karaganda Metallurgical Combine. A bonus was established for every ton of economized metal. The workers of the shop received additional earnings, while the state and the plant received a gain which was several hundred times greater than the expenditures.

This result convinces one that bonus payments for an economy of metal cannot be connected with any other indicators. A special-purpose bonus fund for rolling "at minus" is needed. And the USSR Ministry of Ferrous Metallurgy should distribute it in proportion to the production of output made of the economized metal.

On the average, minus tolerances comprise around 2 percent of the total metal. I think that they cannot be included in production plans. This reserve always has to be at the disposal of a collective. (Let us recall that rolling "at minus" is a voluntary matter). Only in this way will we create an interest in the fullest use of this important reserve.

A "surplus" can be obtained through the united efforts of several collectives. We have mills which produce metal in rolls. They are cut into sheets, packed, and shipped to consumers at other enterprises. The economy will show up at the place where the output is sent to the client. According to the present regulation, the entire bonus will go to the shop in which the sheet was cut and shipped. But the collective which has created the "surplus" will not receive a kopeck.

And so hundreds of thousands of tons of rolled goods are received for dressing with plus tolerances. In ordering the sheet steel, the consumer counted on receiving output of a definite size. But he receives the sheet steel by weight. The number of tons corresponds to the order, but as a result of the plus tolerances the area of the sheet is smaller since it is a bit thicker. And the client is compelled either to decrease his production due to a shortage of raw materials, or to ask for additional metal and overexpend it. It is completely clear that a system of incentives is needed which covers

everybody who is connected with the production of sheet metal.

At the same time, it is necessary to change the system of planning the production of finished rolled goods. The amount of output in tons is the main indicator of the work of rolling workers. This notorious "gross" does not take account of the interests of the economy. And it is not only that the plan in tons does not stimulate the introduction of minus rolling. The shortcoming of this system is contained in something else: it is more profitable for metallurgical workers to give the client more massive products, while requisitions for thin steel sheets and sections of small dimensions are far from fully satisfied.

How does this look in practice? Enterprises receive, as it were, two plans. One is provided by Gosplan USSR for the level of production in tons. The second by the "Soyuzglavmetall" of Gosnab USSR. These are concrete orders by the economy for products of a specific assortment. Very frequently these plans do not coincide.

Rolling workers are interested above all in the "heaviest" orders and they try to produce products at plus tolerances.

Everything would change if metallurgists were to have a plan solely for their total orders which would satisfy the needs of the economy and take account of the area and length of sheets, the thickness of walls, and the length of piping. In that case, they would be interested in producing all of the sections with a minimum expenditure of metal and, that means, they would work only at minus tolerances.

Specialists from "Soyuzglavmetall" have made an interesting calculation. If this year all of the requisitions for rolled sections were to be satisfied not by their weight, but by their use value, that is, by the area and length of sheets, and the diameter and length of piping, then the annual production of rolled goods at operating capacities could be decreased by 600,000 tons.

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CSO: 1821

METALLURGY

IMPROVED METAL QUALITY ADVOCATED

Moscow TRUD in Russian No 136, 14 Jun 79 p 2

[Article by K. Yel'tsov, director of the Dnepropetrovsk Electrometallurgical Plant named A. M. Kuz'min, Hero of Socialist Labor, holder of the USSR State Prize: "Quality is the Key to Quantity"]

[Text] I have occasion to be on foreign assignments in connection with production matters. I walk proudly with my head high among my foreign electrometallurgist colleagues. Because I represent the plant which in its production volume and technical level has no equals in the world. Because I live and work in a country which in a very brief historical period has come out onto the very highest level of economic development and has overtaken the developed countries with regard to the production volume and quality of many types of output.

During the 15th Five-Year Plan the economic might of our state will become even stronger, fixed productive capital will be expanded and renewed, and important economic problems will be solved.

One of them is the constant disproportion between the production of and growing needs for metal for the entire economy. The shortage of metal is holding back the development of many branches. Although, as is known, our country smelts more steel than any other and metallurgy has crossed the line of 150 million tons of steel a year.

However, despite this, the use value of our metal is still low. We expend 1.5 times more metal than the United States for a conventional unit of national income. The metal intensiveness of our products, for example, of metal-cutting machine tools, is 2 to 2.5 times greater than for the output of the machine tool building companies of the United States, Japan, the FRG, England, and France.

Every year billions of rubles are appropriated for new construction to increase the production of metal. But, the same effect, only with smaller expenditures, could be achieved in another way--by improving the quality of steel and improving its use properties on the basis of the introduction

of the achievements of scientific and technological progress.

World practice irrefutably proves that only an improvement in quality is able to solve the problem of the complete satisfaction of the economy's needs for metal.

We know very well how to smelt high quality metal. In recent years foreign companies and states have purchased dozens of licenses from us for the production of special purpose steels.

However, the present system of planning which is oriented above all toward quantitative indicators is, in our opinion, the chief obstacle in the way of the introduction of new materials, solutions, and designs.

It would seem that within our planning quality and quantity should live together splendidly. But at a closer look it turns out that their symbiosis is only possible where existing products or technological processes are improved.

As soon as it is a matter of fundamental changes which affect the interests of several branches or departments initiatives and attempts to introduce something new sometimes encounter insuperable obstacles. More than that, a decision to use or not to use an innovation is made without regard to the final interests of the state.

It has long been known that Swedish ball bearings are two to two and one-half times more durable than ours. We worked for a long time to reveal the secrets of their Scandinavian metallurgists, and we found out that they had a somewhat different approach to the purity and chemical composition of metal. Their steel which goes for the production of ball bearings has less aluminum and more sulphur compounds.

All of their lives metallurgists are educated in the firm conviction that sulphur and metal simply do not combine. Domestic standards for ball bearing steel compel us to struggle against this conviction with all of our might. And now it has turned out that under certain conditions the inclusion of sulphur facilitates the processing of metal, improves slipping, and, finally, results in high use value in the finished product.

Together with specialists from the Zaporozh'ye Machine Building Institute and the Ukrainian Scientific Research Institute of Special Steels we conducted test smeltings and obtained metal of the same chemical composition and quality as the Swedish metal.

Standtests were conducted at one of the country's ball bearing plants. It was proven that we know how to make steel from which ball bearings which are twice as durable as the ones produced today can be made.

The "innovation" promises an enormous economy. Imagine: labor expenditures in our numerous repair workshops will be cut in half, idle time by machinery and equipment and by transportation will be cut in half, and ball bearings which are still scarce today will become available literally to every enterprise. If we shift to the new steel smelting technology, we will be able to release considerable capacities in steel smelting shops and without a single kilowatt of additional electricity and almost without additional expenditures we will be able to increase the smelting of such scarce steels as non-rusting, tool steel, and heat-resistant steel by 100,000 to 150,000 tons a year.

Even the most approximate calculations show that in electrometallurgy and, most important, in the branches of the economy which use ball bearings it is possible to obtain an economy which is estimated in truly astronomical figures.

But it is 10 years now that specialists from the "Sharikopodshipnik" Scientific Research Institute and leaders of the branch do not even wish to hear about the proposals of our metallurgists. And no matter how much we try to prove the advantages of the new steel, nothing helps. Obviously, our system of planning creates conditions under which it is more advantageous for an individual branch not to pay attention to the needs of the country's economy.

This is one example. There is another, diametrically opposed one. Ten years ago there was a conference of the country's aviation engine builders at our plant. One of its participants was Academician B. Ye. Paton who demonstrated the advantages of the use of electroslag metal in engine building. The aviation industry took up the electroslag metal. Having received from us metallurgists steel with higher exploitation properties, our engine builders were able to make maximum use of its possibilities.

Our economy obtained an enormous gain. Idle time by airplanes and labor expenditures to service them decreased by several times. Expenditures of metal and of skilled labor for the production of engines decreased. Without a single kopeck of additional appropriations the economy obtained two first-class machine building plants with complete collectives numbering thousands of machine tool operators, masters, and top-rank mechanics. Here is a classic example of how an improvement of the use properties of metal and of the durability of products made from it solves the problem of increasing quantity.

It turns out that in one branch of the economy they were able to appreciate the advantage to the state from using more progressive materials, while in another they were not? The engine builders were not afraid to reduce production volumes and found an application for the released capacities, while the ball bearing industry did not want or did not dare to undertake a revolutionary break with the developed structure of production. And this is what is curious: neither the one decision which was advantageous

for the state nor the other which was ruinous for it was reflected in any way in the jobs, well-being, or wages of those who made them. Is that correct?

Is it possible that in our country, with our planned economy, the introduction of the new and the determination of the strategic directions of development depends upon the personal qualities of the executive? It seems to me that it is too expensive for the country to make the very important matter of the introduction of scientific and technological progress dependent upon somebody's subjective qualities, wishes, inclinations, or departmental interests.

Speaking about the tasks of economic science, Comrade L. I. Brezhnev stated at the 25th CPSU Congress: "The party and the state are in need of studies of the problems connected above all with a comprehensive development of production and of production management and of recommendations which make it possible to substantially increase production efficiency."

Unfortunately, to this day economic science has not proposed either recommendations or studies aimed at increasing the role of the final economic result in evaluating the work of industrial enterprises and branches.

On 15 December of last year the well-known Soviet airplane designer O. Antonov wrote in TRUD about the necessity of making not the ruble, not the ton, but the final result of work and the effectiveness of a machine, process, or material the chief indicator of planning. For example, he proposed that the production of rolled goods be planned for theoretical weight multiplied by durability. It is his idea that the first indicator will create an interest in producing output at minus tolerances, while the second will stimulate the production of improved metal--alloyed, vacuumed, thermo-resistant, and so forth--which "works" much better than ordinary metal.

But with present planning according to sales and commodity and gross output neither the producers of metal nor its consumers have any need to think about quality. For this reason every branch needs to have an evaluative indicator which combines in itself demands upon quality, technical improvements, and also upon the final result--effectiveness in the economy. As yet there are no such systems indicators and we are losing a great deal because the planning assignments of every enterprise and branch do not serve the chief goal--to always achieve the greatest national economic effect.

Suffice it to say that for many years electroslog remelting units were not loaded with orders. Is it possible that nobody needed metal which had accomplished a revolution in aviation engine building?

In our economy paradoxical situations are possible in which a struggle for quality in the end develops into attempts to improve quantitative indicators. Our plant is a very large supplier of nickel. But recently, instead of

Grade HIII nickel, non-ferrous metallurgy enterprises have begun to supply us with the cleaner HIV nickel which is 400 rubles per ton more expensive.

We do not need raw materials of such purity: we do not get any additional advantages from it, nor does the state. Why bear additional expenditures for purification? The answer is simple: so that on the basis of an increase in costs one's indicators for gross output, for output sales, and for labor productivity can be improved. And this is achieved easily without increasing production or decreasing the number of workers.

The payment is made for this by us consumers who without any benefit have overexpended around three million rubles and have decreased our profits and material incentives funds. Who needs the kind of quality which does not produce any effect and which leads only to pumping resources from one branch into another?

How much more difficult to solve problems if you want to achieve an increase in labor productivity and a decrease in expenditures by means of the re-equipping of production. We have long felt that our intra-plant railroad transportation does not satisfy our needs. We have an enormous railroad enterprise in which hundreds of people are employed, but its efficiency is low. It happens that it is necessary to expend from 8 to 24 hours to ship freight from one shop to another over a distance of 100 to 500 meters.

We're proposing that use be made of the experience of foreign metallurgy in which intra-plant hauls are made by special motor vehicle transport. Our experiments to reconstruct the weak and poorly adapted timber haulers at the Solombal' Plant have shown the high efficiency of intra-plant motor vehicle transport.

For many years we tried to prove the necessity for this measure both in our ministry and to motor vehicle builders. But only literally several days ago our plant received the first experimental motor vehicle track which was created by the collective of the Belgorod Motor Vehicle Repair Plant. We can already see that it will provide an enormous effect in hauling ingots from steel smelting to rolling shops.

According to the calculations of planning workers from the Ukgipromez [expansion unknown], the transference of plant hauls to the new type of transportation will make it possible to reimburse all of the expenditures in less than four years. A minimum period for ferrous metallurgy.

Unfortunately, our system of evaluative indicators has a negative effect upon the content of equipment. The pursuit of tonnage and gross output can lead to postponements of unit repairs and, in the end, to entire plants being stopped due to accidents. During the years of the First Five-Year Plans when we smelted much less metal the evaluative indicators and the terms of material stimulation depended upon a precise observance of repair schedules, and executives were called to the strictest account for failing to meet them.

Today more and more is being said and written about the necessity for improving the planning system. And it seems to me also that the necessity for this has arrived. It is obvious that Gosplan and the USSR Ministry of Finance have to charge leading economic institutes to work jointly with ministries in developing the kind of system which would automatically interest enterprises in achieving the general state advantage, would stimulate the introduction of the latest scientific and technical achievements and of advanced technology, and would compel economic executives to show concern for a constant improvement of production.

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